2 PROPOSED ACTION AND ALTERNATIVES

This chapter describes the proposed action and the five alternatives that are analyzed in the EIS. It also describes other alternatives (two alternative routes and alternative technologies) that were considered but dismissed from detailed analysis. Descriptions of transmission line specifications; construction, operation, and maintenance activities; and schedule and mitigation common to all construction alternatives are also provided.

The five alternatives analyzed in this EIS are as follows:

1. Modified Consolidated Corridors Route,

2. Consolidated Corridors Route,

3. Previously Permitted Route (No Action),

4. MEPCO South Route, and

5. Rescission of the Presidential Permit PP-89.

These alternatives are described in more detail in Section 2.1. The first four are route alternatives (including the No Action Alternative) and could result in construction of the 345-kV transmission line. The rescission alternative could not result in construction of the line along any route. A summary comparison of the impacts of these analyzed alternatives is provided in Section 2.5.

DOE's proposed action is to grant the amendment to Presidential Permit PP-89 for construction of the line along the Modified Consolidated Corridors Route. This is the applicant's and DOE's preferred alternative. DOE could choose, however, to grant an amendment to PP-89 for any one, two, or three of the new routes (Modified Consolidated Corridors Route, Consolidated Corridors Route, and MEPCO South Route).

If DOE were to deny an amendment to the Presidential Permit, PP-89 would remain in effect and a transmission line could be constructed along the Previously Permitted Route, as analyzed under the Previously Permitted Route Alternative (equivalent to "No Action" on the part of the Department).

If DOE were to both deny the amendment to the Presidential Permit and rescind PP-89, no transmission line as proposed could be built.

2.1 ALTERNATIVES ANALYZED

2.1.1 Alternative Routes

Alternative routes between the two desired connection points are considered by the applicant for the purpose of selecting the transmission line corridor that is best, that is, that holistically optimizes considerations of impacts, practicality, viability, economics, reliability, etc. The four route alternatives presented in this EIS reflect the outcome of the applicant's selection process.

The four alternative routes, including the applicant's preferred transmission line route, are evaluated in detail in this EIS for their environmental impacts: (1) Alternative One, the Modified Consolidated Corridors Route, the proposed action and the applicant's and DOE's preferred route; (2) Alternative Two, the Consolidated Corridors Route; (3) Alternative Three, the Previously Permitted Route, also considered the No Action Alternative; and (4) Alternative Four, the MEPCO South Route (Figure 2.1-1). All of these routes have the same beginning and end points, namely the Orrington Substation and the crossing of the St. Croix River near Baileyville. Also, the initial 12.2 mi (19.6 km) from the Orrington Substation would be identical for all four routes (Figure 2.1-2). The applicant (BHE 2004) considered a number of factors when evaluating alternative routes, including concerns expressed by State and local authorities, local zoning and planning regulations, cost and engineering criteria, and environmental and land use considerations. Through its stakeholder outreach process, the applicant solicited and considered public comment regarding all of the route alternatives. DOE conducted public scoping meetings as described previously. The scoping process was designed to solicit concerns and suggestions from property owners, local residents, government agencies, Indian tribes, public interest groups, and other stakeholders. DOE has reviewed the methodology and rationale employed in the applicant's evaluation and, on the basis of that review, concludes that the alternative routes identified by the applicant are an acceptable range of reasonable alternatives.

2.1.1.1 Alternative One: Modified Consolidated Corridors Route (Preferred Alternative)

From the Orrington Substation, the Modified Consolidated Corridors Route would parallel the existing 345-kV MEPCO transmission line to Blackman Stream in Bradley (Figure 2.1-2). The Modified Consolidated Corridors Route would then proceed northeast within a new corridor until meeting Stud Mill Road and the M&N gas pipeline right-of-way (ROW); it would then proceed east-northeast, generally paralleling the M&N gas pipeline and Stud Mill Road to the international border near Baileyville, Maine (Figures 2.1-2 and 2.1-3). The Modified Consolidated Corridors Route would cross 3 counties and 17 municipalities or townships (Table 2.1-1). The total distance of the Modified Consolidated Corridors Route would be about 85 mi (137 km) and would consist of 15 mi (24 km) of new ROW, 58 mi (93 km) adjacent to the M&N gas pipeline and/or Stud Mill Road, and 12 mi (19 km) adjacent to the existing MEPCO

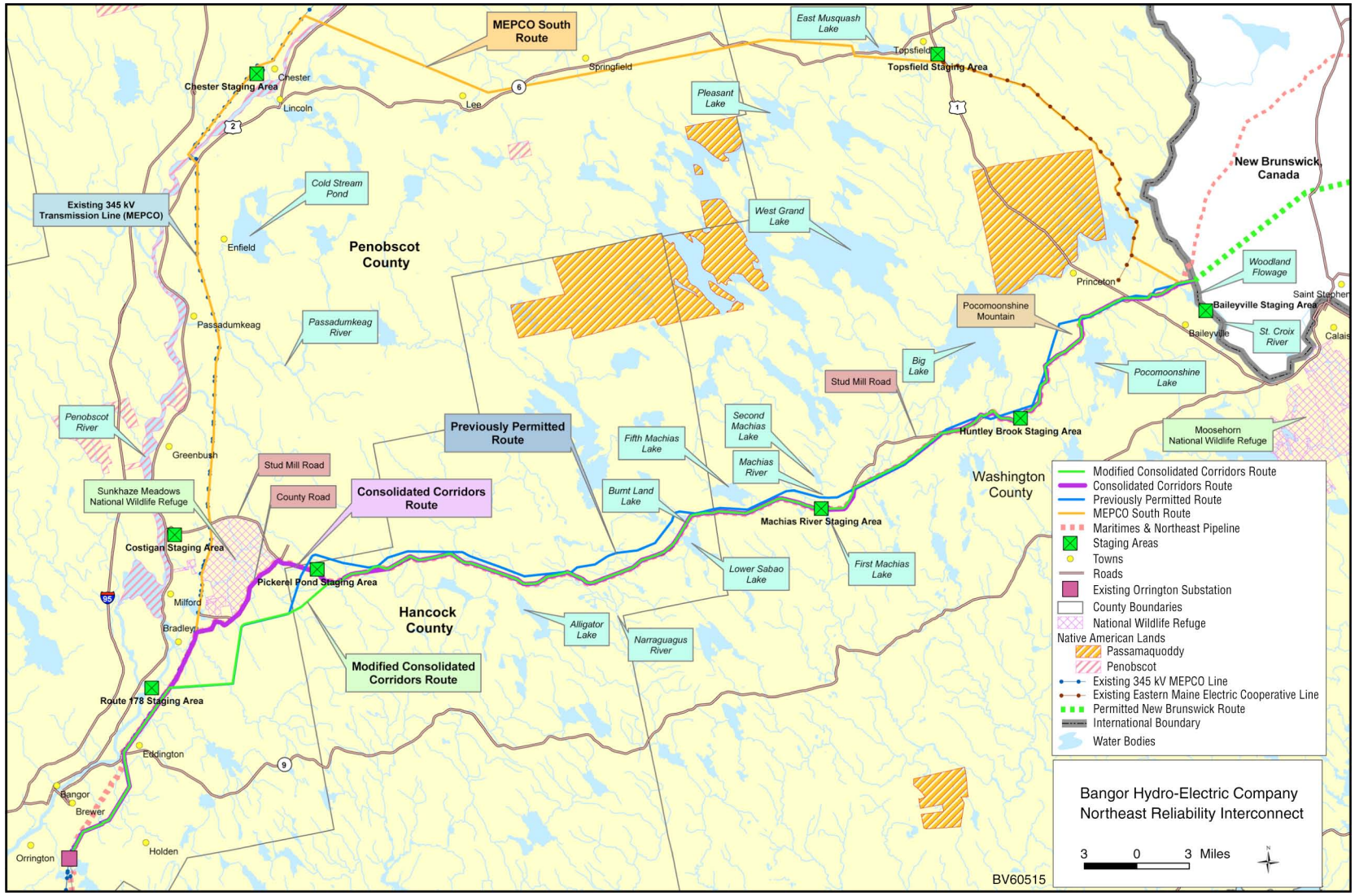

FIGURE 2.1-1 Alternative Route and Staging Area Locations (Source: Paquette 2005kk)

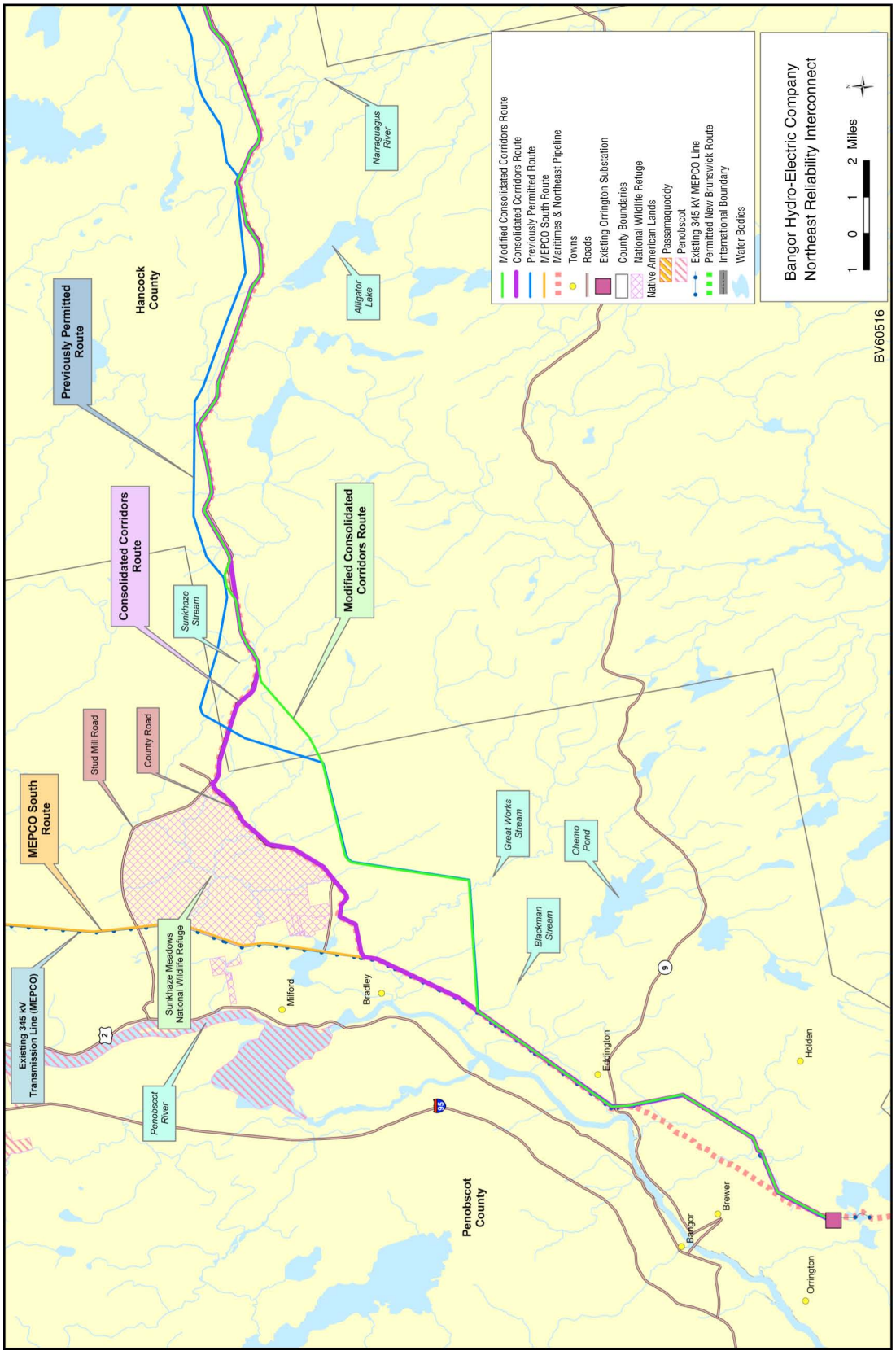

FIGURE 2.1-2 Location Where the Alternative Routes Initially Diverge (Source: Paquette 2005kk)

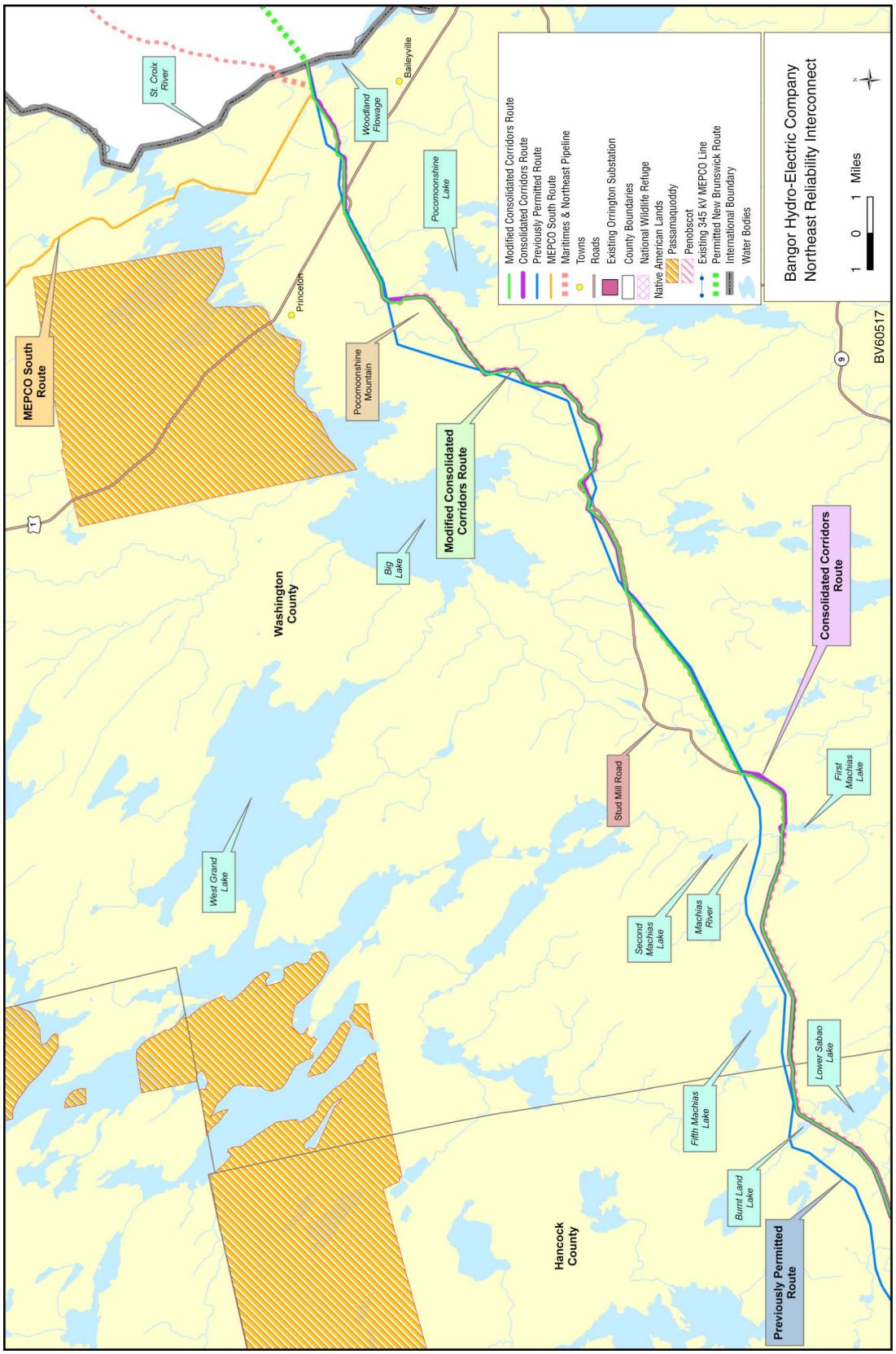

FIGURE 2.1-3 Location of the Alternative Routes within Washington County (Source: Paquette 2005kk)

TABLE 2.1-1 Counties and Municipalities Traversed by the Previously Permitted, Consolidated Corridors, and Modified Consolidated Corridors Routes

County	Municipality[a]	Type of Municipality[b]
Penobscot	Orrington	Town
	Brewer	City
	Holden	Town
	Eddington	Town
	Bradley	Town
	Milford	Town
	Greenfield	Town
Hancock	T32 MD	Unorganized township
	Great Pond	Town
	T34 MD	Unorganized township
	T35 MD	Unorganized township
Washington	T36 MD	Unorganized township
	T37 MD	Unorganized township
	T27 ED	Unorganized township
	Township No. 21	Unorganized township
	Princeton	Town
	Baileyville	Town

[a] ED = Eastern Division; MD = Middle Division; T = Township.

[b] Unorganized townships are not "municipalities" under Maine law. They have been referred to as such in this EIS, however, for convenience.

Source: DeLorme (2004).

345-kV transmission line (including portions that are co-located with the M&N gas pipeline and/or other transmission lines). Figure B.1-1 (Appendix B) provides a detailed map of the Modified Consolidated Corridors Route.

2.1.1.2 Alternative Two: Consolidated Corridors Route

The Consolidated Corridors Route would be similar to the Modified Consolidated Corridors Route, except where the Modified Consolidated Corridors Route deviates from it in two locations (Figures 2.1-2, 2.1-4, and 2.1-5). The first and longest route deviation occurs between Blackman Stream and Stud Mill Road southeast of Pickerel Pond (Figure 2.1-4).[1] The

[1] This divergence between the Modified Consolidated Corridors and the Consolidated Corridors Routes is referred to as the "Pickerel Pond Reroute" because of the divergence ending just southeast of Pickerel Pond.

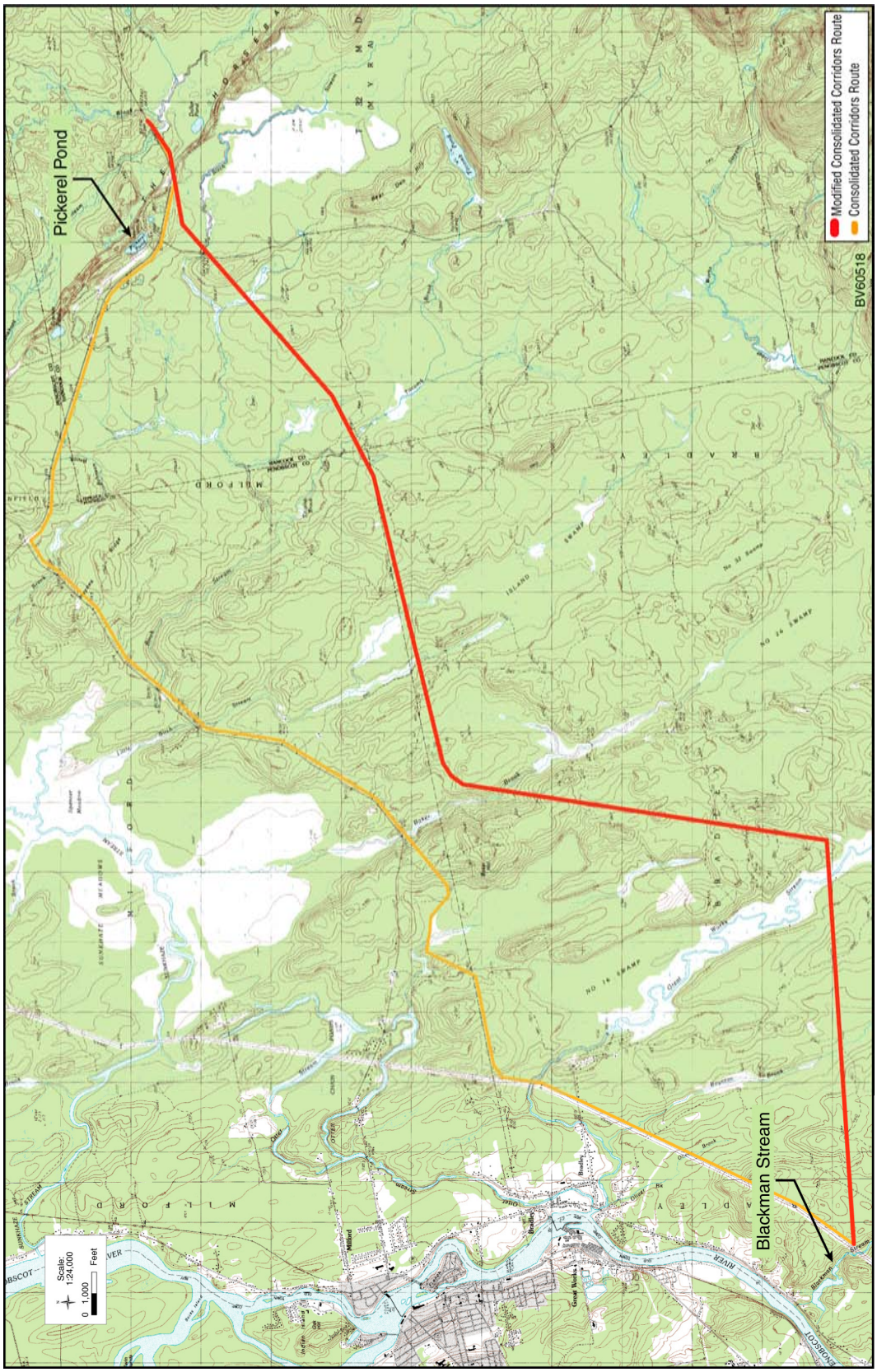

FIGURE 2.1-4 Modified Consolidated Corridors Route and Consolidated Corridors Route Divergence between Blackman Stream and the Pickerel Pond Area (Source: Paquette 2005e)

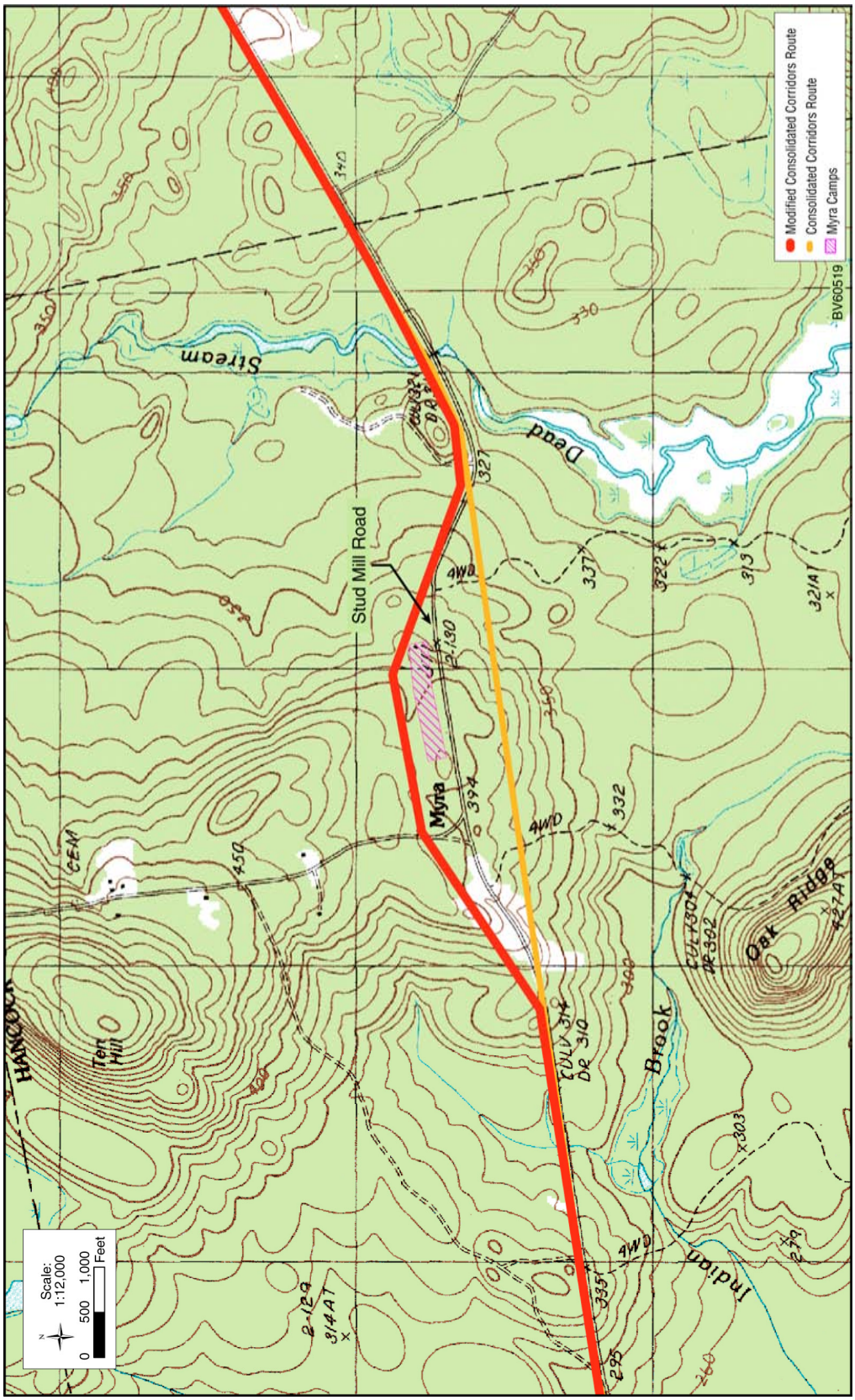

FIGURE 2.1-5 Modified Consolidated Corridors Route and Consolidated Corridors Route Divergence in the Area of Myra Camps (Source: Paquette 2005d)

second deviation occurs in the area of Myra Camps, just west of Dead Stream (Figure 2.1-5).[2] The Consolidated Corridors Route would pass around the south side of Myra Camps, whereas the Modified Consolidated Corridors Route would pass around the north side of Myra Camps. After this short deviation, the Consolidated Corridors Route and the Modified Consolidated Corridors Route would be identical to the international border near Baileyville, Maine. The Consolidated Corridors Route would cross the same counties and municipalities as the Modified Consolidated Corridors Route (Table 2.1-1). The Consolidated Corridors Route would traverse a total distance of about 85 mi (137 km) and would consist of 2 mi (3 km) of new ROW, 68 mi (109 km) adjacent to the M&N gas pipeline and/or Stud Mill Road, and 15 mi (24 km) adjacent to the existing MEPCO 345-kV transmission line (including portions that are co-located with the M&N gas pipeline and/or other transmission lines). Figure B.2-3 (Appendix B) provides a detailed map of the Consolidated Corridors Route where it differs from the Modified Consolidated Corridors Route.

2.1.1.3 Alternative Three: Previously Permitted Route (No Action)

The initial portion of the Previously Permitted Route from the Orrington Substation would be the same as the Modified Consolidated Corridors Route until it crosses the border between Penobscot and Hancock Counties (Figure 2.1-2). The Previously Permitted Route would then proceed to the east-northeast, generally paralleling the M&N gas pipeline and Stud Mill Road to the international border crossing near Baileyville, Maine (Figures 2.1-2 and 2.1-3). Although formerly known as the Stud Mill Road Route, the Previously Permitted Route would not be immediately adjacent to the road but would be separated by as much as 9,400 ft (2,865 m). The Previously Permitted Route would cross over Stud Mill Road 13 times, would parallel the road in several locations with about a 200-ft (61-m) separation, and would have an average separation of 2,500 ft (762 m). It would cross the same counties and municipalities as the Modified Consolidated Corridors Route (Table 2.1-1). The total distance of the Previously Permitted Route would be about 84 mi (135 km) and would consist of 62 mi (100 km) of new ROW, 10 mi (16 km) adjacent to the M&N gas pipeline and/or Stud Mill Road, and 12 mi (19 km) adjacent to the existing MEPCO 345-kV transmission line (including portions that are co-located with the M&N gas pipeline and/or other transmission lines). Figure B.3-1 (Appendix B) provides a detailed map of the Previously Permitted Route.

2.1.1.4 Alternative Four: MEPCO South Route

From the Orrington Substation, the MEPCO South Route would parallel the existing 345-kV transmission line to Chester, Maine (Figure 2.1-1). This route includes an initial crossing of the Penobscot River south of Lincoln. The route would then proceed southeast (recrossing the Penobscot River) to Route 6 east of Lee, Maine. The MEPCO South Route would then generally parallel, but not be co-located with, Route 6 until just west of Route 1 at Topsfield, Maine. The

[2] This divergence between the Modified Consolidated Corridors Route and the Consolidated Corridors Route is referred to as the "Myra Camps Reroute."

route would then generally proceed southeast to the international border near Baileyville, Maine (Figure 2.1-1). The MEPCO South Route would cross 2 counties and 23 municipalities or townships (Table 2.1-2). The total distance of the MEPCO South Route would be about 114 mi (183 km) and would consist of 39 mi (63 km) of new ROW, 54 mi (87 km) adjacent to the existing MEPCO 345-kV transmission line (including portions that are co-located with the M&N gas pipeline and/or other transmission lines), and 21 mi (34 km) adjacent to an existing EMEC 69-kV transmission line (Figure 2.1-1). Figure B.4-1 (Appendix B) provides a detailed map of the MEPCO South Route.

TABLE 2.1-2 Counties and Municipalities Traversed by the MEPCO South Route

County	Municipality[a]	Type of Municipality[b]
Penobscot	Orrington	Town
	Brewer	City
	Holden	Town
	Eddington	Town
	Bradley	Town
	Milford	Town
	Greenbush	Town
	Passadumkeag	Town
	Enfield	Town
	Mattamiscontis Township	Township
	T2 R8 NWP	Unorganized township
	Chester	Town
	Lincoln	Town
	Winn	Town
	Lee	Town
	Springfield	Town
	Carroll Plantation	Town
Washington	Kossuth Township	Township
	Topsfield	Town
	Talmadge	Unorganized township
	Waite	Town
	Fowler Township	Township
	Baileyville	Town

[a] NWP = north of Waldo Patent; R = range; T = Township.

[b] Unorganized townships are not "municipalities" under Maine law. They have been referred to as such in this EIS, however, for convenience.

Source: DeLorme (2004).

2.1.2 Rescission of the Presidential Permit

Under the Rescission of the Presidential Permit Alternative, the presently permitted transmission line could not be constructed. Thus, it is reasonably foreseeable that the environmental status quo would continue and that there would be no environmental impacts related to the construction, operation, maintenance, and connection of a transmission line. It is possible, however, that BHE or another entity could take other actions to achieve the purpose of the proposed project if the currently permitted or proposed transmission line were not built. This EIS does not include speculation on other actions that could be taken in the event of a permit rescission, nor does it assess the impacts of those other actions.

2.2 ALTERNATIVES CONSIDERED BUT DISMISSED FROM DETAILED ANALYSIS

The applicant states that there is currently an excess generation capacity in Maine but a limited ability to move the energy to markets where it is needed. Therefore, BHE (2004) did not consider the potential to increase power generation as a reasonable alternative to the proposed transmission line. However, in addition to the four alternative routes described in Section 2.1.1, the applicant did consider two other alternative routes. The applicant also considered various engineering or system alterations (i.e., constructing some of the proposed transmission line underground, converting the existing 345-kV transmission line to direct current [DC] from AC, and uprating the existing 345-kV transmission line). On the basis of the applicant's alternative identification process, scoping comments, and DOE's own considerations, the following alternatives were dismissed from further analysis.

2.2.1 Alternative Routes

Two alternative routes considered but dismissed from further analysis were (1) the MEPCO Route to Orient, Maine (Point Lepreau via Keswick), and (2) Route 9 Route. Both of these alternative routes were considered in the original EIS (DOE 1995).

2.2.1.1 MEPCO Route to Orient, Maine

The MEPCO Route to Orient, Maine, alternative would parallel the existing MEPCO 345-kV line ROW from the Orrington Substation to the international border at Orient, Maine (Figure 1.1-1). The total distance of this route would be about 101 mi (163 km). After entering New Brunswick, the line would generally proceed southeast to the substation at the Point Lepreau Nuclear Generating Station.[3]

[3] In a letter sent to BHE, NB Power stated that it could not and would not construct the complementary Canadian portion of the MEPCO Route to Orient, Maine, because of increased costs and environmental impacts, coupled with the reduced system performance and benefits associated with this alterative route (Snowdon 2005).

Partly because the MEPCO Route to Orient would parallel the existing MEPCO line, it was eliminated as a reasonable alternative. It would not achieve the same degree of reliability that would be associated with constructing a second high-voltage line largely located within a separate ROW corridor. Also, because of the length of the MEPCO Route to Orient, line losses of energy would be significantly greater for this route compared with the other alternative routes. Several potential environmental impacts that would be notably greater than those associated with the range of potential impacts for the alternative routes analyzed were also a factor in dropping this alternative from further analysis, including (1) the highest acreage, number, and length of wetlands crossed by any of the alternative transmission line ROWs; (2) the highest number of temporary access road crossings of wetlands and water bodies; and (3) the greatest acreage of deer wintering areas crossed by any of the ROWs.

2.2.1.2 Route 9 Route

The Route 9 Route alternative would initially parallel the existing MEPCO 345-kV line from the Orrington Substation to the vicinity of Eddington, Maine. It would then generally parallel Route 9 (the major east-west highway between Bangor and Calais) to U.S. 1, where it would closely parallel U.S. 1 until meeting up with the M&N gas pipeline northwest of Baileyville and then generally follow the same route as the pipeline to the international border near Baileyville, Maine. The total distance of the Route 9 Route would be about 94 mi (151 km).

The Route 9 Route was eliminated as a reasonable alternative for the following reasons: (1) it would require the greatest amount of new ROW compared with the analyzed alternatives (i.e., it would be inconsistent with the MBEP's goal of co-locating the proposed transmission line with existing infrastructure projects); (2) river crossings of the Machias, Narraguagus, and Union Rivers would be more difficult and extensive than for the other alternative routes; (3) several large wetlands would have to be traversed (or there would be major route changes), especially in the area of the Whalesback esker and the Mopang, Crawford, and Meddybemps Lakes; (4) the corridor route would be more hilly and rugged, particularly west of the Machias River, than the other alternative routes (thus, for example, increasing the potential for erosion); (5) the route would have the greatest potential for visual impacts on residents, because it would have the largest number of dwellings within 600 ft (183 m)[4] compared with the analyzed alternatives; (6) the greatest number of dwellings would be displaced; (7) the acreage needed for clearing temporary access roads would be excessive; (8) other than the MEPCO Route to Orient, it would have the greatest acreage of deer wintering areas crossed by the ROW; (9) more recreational use and scenic resource features within the viewshed would be impacted by this route than by any other alternative route; and (10) the ROW would cross the greatest number of Outstanding River Segments.[5]

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[4] During BHE's stakeholder process, 600 ft (183 m) was determined to be a reasonable maximum distance for the evaluation of visual impacts to homeowners in the proximity to the various route alternatives. Although subjective, this distance takes into consideration landscape, topography, and vegetation in the project area and was arrived at through a consensus of BHE's stakeholder group (about 40 interested parties).

[5] Rivers declared by the Maine Legislature to provide irreplaceable social and economic benefits to people because of their unparalleled natural and recreational values.

2.2.2 Alternative Technologies

2.2.2.1 Underground Transmission System

Installing an AC transmission line underground may be a technically feasible alternative. However, because of the length of the line and characteristics of AC, there would be marked difficulty with insulation and power leakage through the soil. Accordingly, an AC underground system would not be practical. If an underground alternative were still considered, it would be a DC system, as is commonly used for power lines of this nature.

The high-voltage underground transmission line would be installed in a continuous trench. The land above and in the vicinity of the line would have to be maintained free of trees and shrubs to avoid direct interference by roots (ATC 2004). Improved access would also be required for the length of the line. One or more aboveground substations for power conditioning equipment could be needed. AC to DC (and back again) conversion stations would be required to switch between an underground and an overhead configuration. Both conversion stations would be located in Maine, as the Canadian portion of the line would remain AC. These transition stations generally require an area of about 110 ft by 120 ft (33.5 m by 36.6 m), or about 0.3 acres (0.1 ha) (BHE 2005).

Costs for an underground system are about 10 times more than for a comparable overhead system. With regard to the proposed project, BHE (2005) reported that the cost of installing the transmission lines underground for just the Narraguagus and Machias River crossings would be $11 million, compared with the overhead crossing cost of less than $1 million.[6]

2.2.2.2 Converting the Existing MEPCO Line from Alternating Current to Direct Current

Converting the existing MEPCO 345-kV AC transmission line to a high-voltage DC line would eliminate some of the reliability issues that currently limit transfers on the existing MEPCO line and would allow transfers up to the full thermal limit of the line. However, this option would not achieve the reliability improvements that would result from constructing an additional new line. Converting the existing AC line to DC would require adjustments to the existing transmission line to accommodate the DC and installation of AC/DC converters in Orrington, Maine, and New Brunswick. More importantly, energy losses also would occur from the conversion from AC to DC and then back to AC.

There would also be a permanent reliability impact of losing the BHE system resulting from loss of the line south of the Orrington Substation because of the lack of available short-circuit current to commutate (reverse every other cycle of an AC current to form a unidirectional

6 The applicant considered installing the NRI underground only at the two river crossings but did not consider an underground alternative for the entire transmission line.

current) the Orrington DC converter. In addition, there would be a change in system response caused by DC being controllable (versus free flowing for the AC system). Finally, each of the two required DC converter terminals would cost about the same as the entire NRI constructed as an AC system (Sloan 2005b).

2.2.2.3 Uprating the Existing MEPCO Line

Uprating involves increasing the amount of power transmitted through an existing circuit; this is usually accomplished by increasing either the voltage or the current. Uprating the MEPCO 345-kV transmission line would require system equipment changes, which could include increasing the conductor size and/or increasing the conductor elevation. The installation of larger conductors would require stronger support structures, not only for the increased weight of the conductors, but also to tolerate higher wind and ice loading. These upgrades would result in a complete rebuild of the MEPCO line. More importantly, uprating would not achieve the reliability provided by an additional new transmission line.

The existing MEPCO 345-kV transmission line is not thermally limited, but rather limited by the connected electrical transmission system. Therefore, uprating the MEPCO line would do little to change the overall electrical transmission system (Sloan 2005b), and it would not provide a redundant electrical path between Maine and New Brunswick.

2.3 TRANSMISSION LINE SPECIFICATIONS, CONSTRUCTION, OPERATION, MAINTENANCE, AND SCHEDULE COMMON TO ALL ALTERNATIVE ROUTES

2.3.1 Transmission Line Design Parameters

Table 2.3-1 lists the basic design parameters for the proposed AC transmission line. The transmission line would have a single-circuit configuration and would consist of two overhead shield wires and three phases with two conductor wires per phase. Table 2.3-1 lists the number of structures required and the average span between structures for each of the alternative routes. Self-supporting wood-pole H-frame structures (Figure 2.3-1) would be used as the tangent support structure (i.e., structures used where the line is essentially following a straight path). The length of the wood poles could range from 65 to 110 ft (20 to 33.5 m), but most would be 95 to 100 ft (29 to 30.5 m). Ten percent of their length (plus 2 ft [0.6 m]) would be buried. Thus, pole tops would be an average of 83 to 88 ft (25 to 27 m) above ground.

In addition to tangent structures, angle and dead-end structures would be required. These structures would consist of either three wood poles or three steel poles (Figures 2.3-2 through 2.3-7). The wood-pole angle and dead-end structures would use guy wires for support (Figures 2.3-2 through 2.3-5), while guy wires would not be required for the steel-pole structures (Figures 2.3-6 and 2.3-7). Dead-end structures would be required either (1) where the line makes

TABLE 2.3-1 Design Parameters for the NRI

Parameter	Value (or Description)[a]			
	MCCR[b]	CCR	PPR	MSR
Length of line (U.S. portion)	85 mi	85 mi	84 mi	114 mi
Voltage	345 kV			
Capacity	500 MW[c]			
Conductors	Standard 1,192.5 kcml[d] 45/7 ACSR[e] code "bunting" (two per phase) with a diameter of 1.302 in., a weight of 1.344 lb/ft, and a rated breaking strength of 32,000 lb			
Shield wires	Standard 7 No. 8 Alumoweld[f]			
Guy wires (if, and where, required)	Standard 7 No. 5 Alumoweld, 0.546-in. diameter			
Insulators – conductor Insulators – shield wire	5.75-in. × 10-in. porcelain ball and socket or polymer composite units Porcelain pin-clevis type			
Number of structures (total)	608	636	563	885
Tangent (wood)	491	472	499	821
Angle and dead-end (wood)	110	86	64	60
Angle and dead-end (steel)	7	78	0	4
Average span length (ft)	731	706	786	680
Minimum vertical clearance to vegetation (ft)	15			

[a] To convert miles to kilometers, multiply by 1.609; to convert inches to centimeters, multiply by 2.54; to convert pounds to kilograms, multiply by 0.454; to convert feet to meters, multiply by 0.305.

[b] CCR = Consolidated Corridors Route, MCCR = Modified Consolidated Corridors Route, MSR = MEPCO South Route, PPR = Previously Permitted Route.

[c] Maximum capacity of 1,000 MW during emergency conditions.

[d] kcml = 1,000 circular mil(s); the wire size for multiple-stranded conductors. A mil is one thousandth of an inch (0.001 in.) or approximately 0.0254 millimeters.

[e] ACSR = aluminum conductor, steel reinforced.

[f] One shield wire may be replaced with an optical ground wire if BHE were to install fiber-optic communication as part of the project.

Sources: BHE (2004, 2005); Paquette (2004; 2005j,y,z,aa).

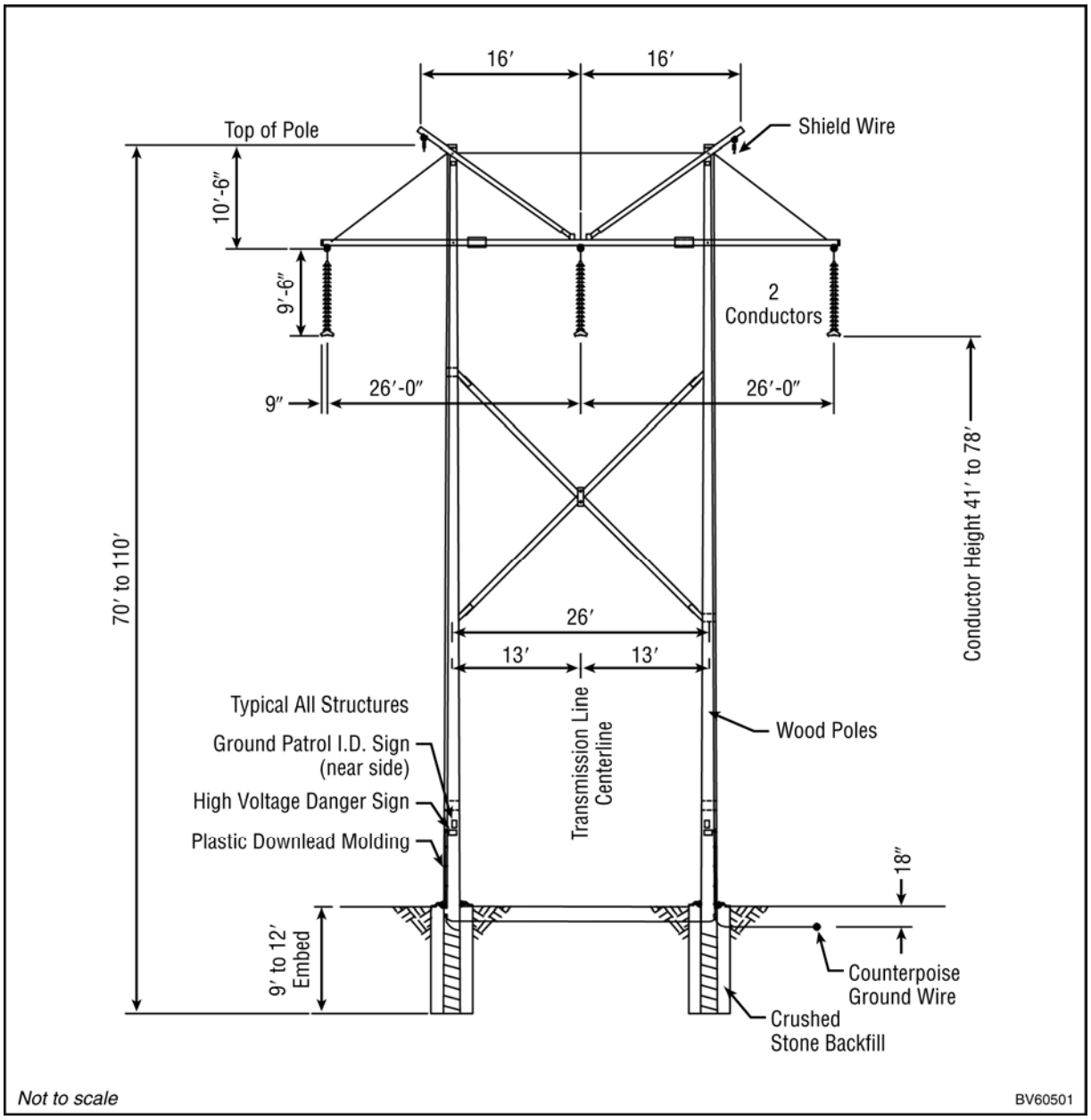

FIGURE 2.3-1 H-Frame Wood-Pole Tangent Support Structure (Source: Paquette 2005l)

an angle of 30 degrees or more, or (2) after 7 to 8 mi (11.3 to 12.9 km) of continuous suspension-type (tangent and light- and medium-angle) support structures to prevent the potential cascading (domino-like collapse) of all of the support structures in the event of a major accident. A dead-end structure would also be used for the last structure before the crossing of the St. Croix River.

The conductors would be protected from lightning strikes by grounding systems installed at each structure (counterpoise ground wires) and by two aerial ground wires (shield wires). The

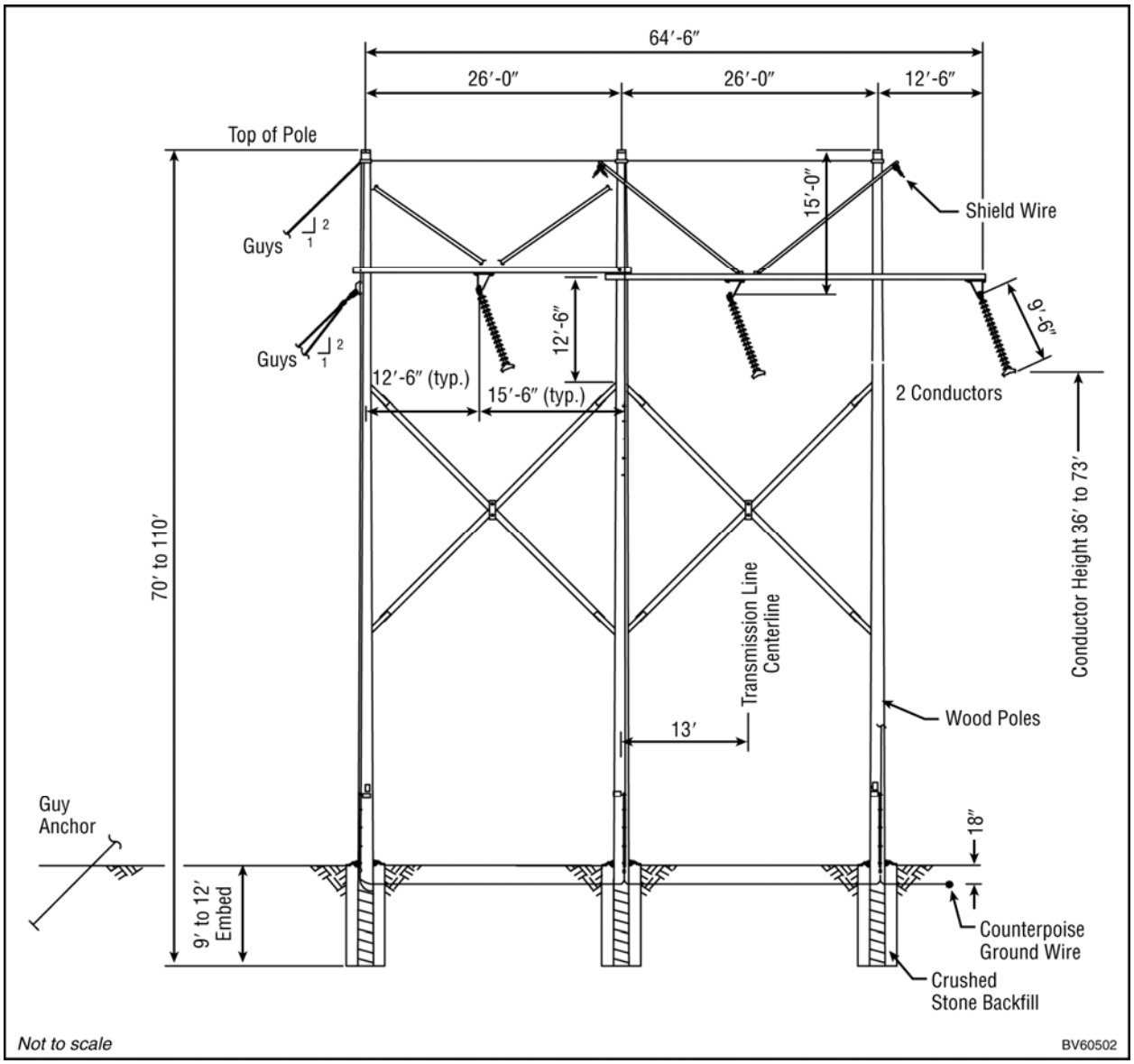

FIGURE 2.3-2 Light Angle Wood-Pole Support Structure (Source: Paquette 2005l)

transmission line would meet required horizontal and vertical clearance requirements as discussed below. Transmission line height would reflect requirements for protecting the line from interference due to tall trees. The amount of sag on a given conductor would be determined by a number of variables, including distance between towers, conductor weight, capacity, and temperature. Conductors also swing laterally. Side clearance would be determined on the basis of a worst possible condition (i.e., high temperature and high wind velocities). A minimum distance would be maintained between conductors of different phases or voltages to prevent "flashover," defined as a sudden surge of voltage causing an arc between conductors. Conductor heights would range from 26 to 65 ft (7.6 to 19.8 m) above the ground.

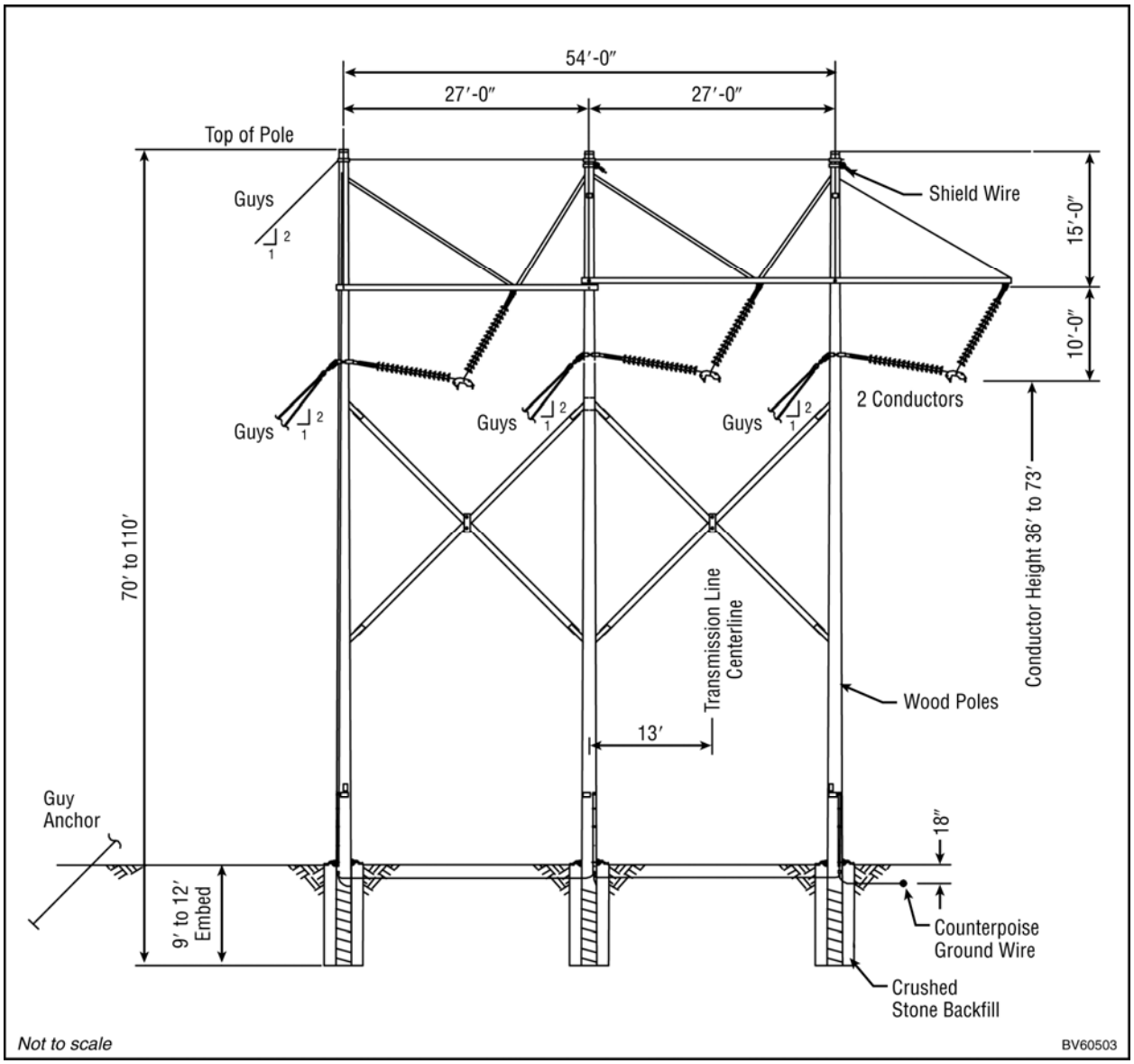

FIGURE 2.3-3 Light-Medium Angle Wood-Pole Support Structure (Source: Paquette 2005l)

The transmission line design would meet the National Electric Safety Code specifications for heavy-loading conditions (e.g., radial ice of 0.5 in. [1.3 cm] thickness and 4 lb/ft^2 [19.5 kg/m^2] of wind pressure) and extreme wind conditions (i.e., wind pressure of 23 lb/ft^2 [112 kg/m^2], equivalent to a wind speed of 90 mph [145 kph]). In addition, the transmission structures would be designed to withstand heavy icing as determined from a review of meteorological data (e.g., radial ice of 1.3 in. [3.3 cm] thickness) and longitudinal loading imbalance due to differential ice buildup and sheering.

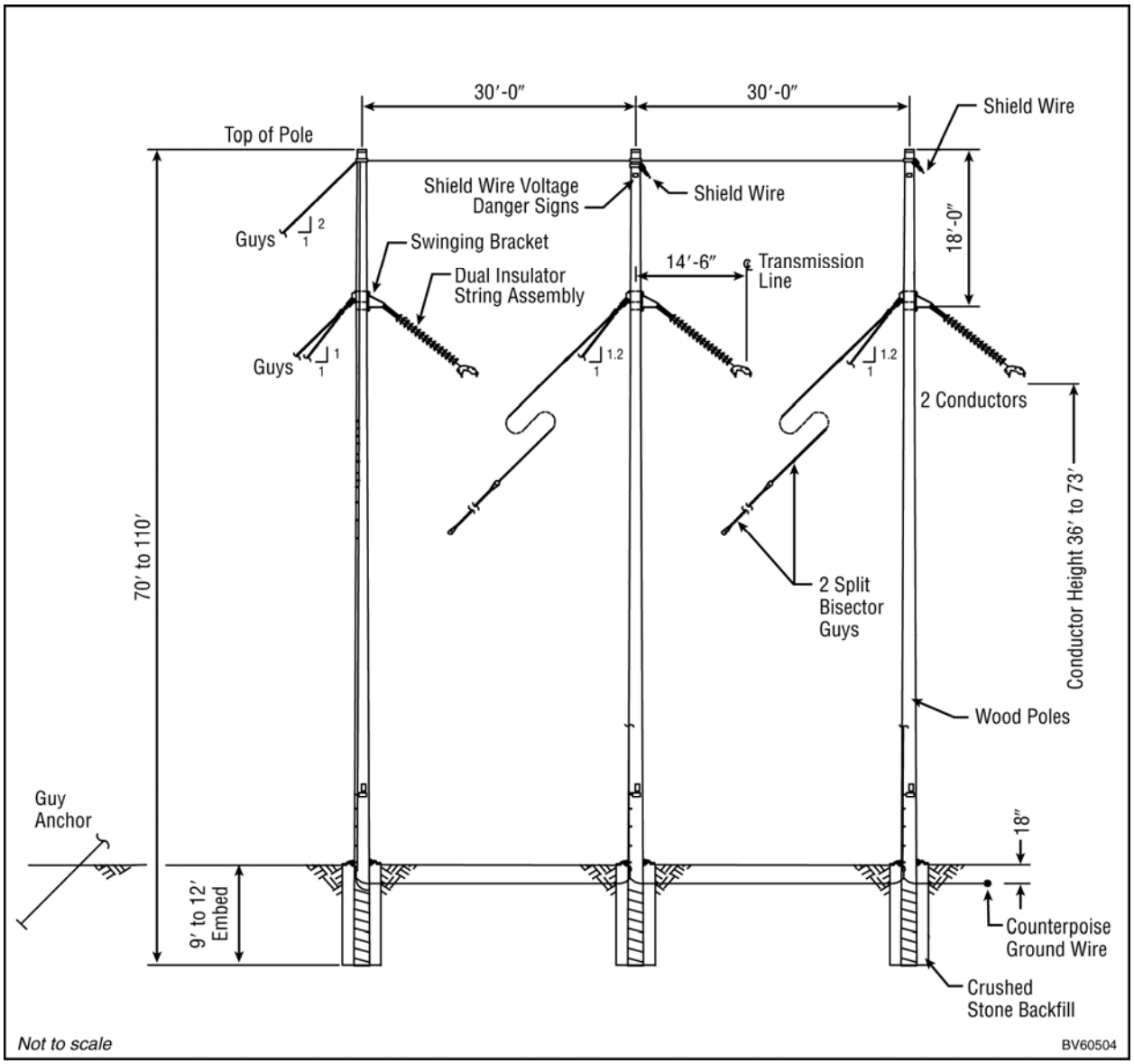

FIGURE 2.3-4 Heavy-Medium Angle Wood-Pole Support Structure (Source: Paquette 2005l)

2.3.2 ROW Configurations

The ROW widths for various segments of the transmission line routes would depend on the types of support structures and their proximity to existing utility ROWs or roads. The wood-pole H-frame support structure and its horizontal configuration of phases (a 26-ft [7.9-m] separation from the outside phase to the centerline) were used as the standard support structure design to estimate the ROW widths (Figure 2.3-8). The ROW width for a new corridor segment would be 170 ft (51.8 m). This width is based on the spacing of the conductors (26 ft [7.9 m]) and the desired clearances of the outside conductor to the edge of the ROW (e.g., to trees) to ensure a safe and reliable line.

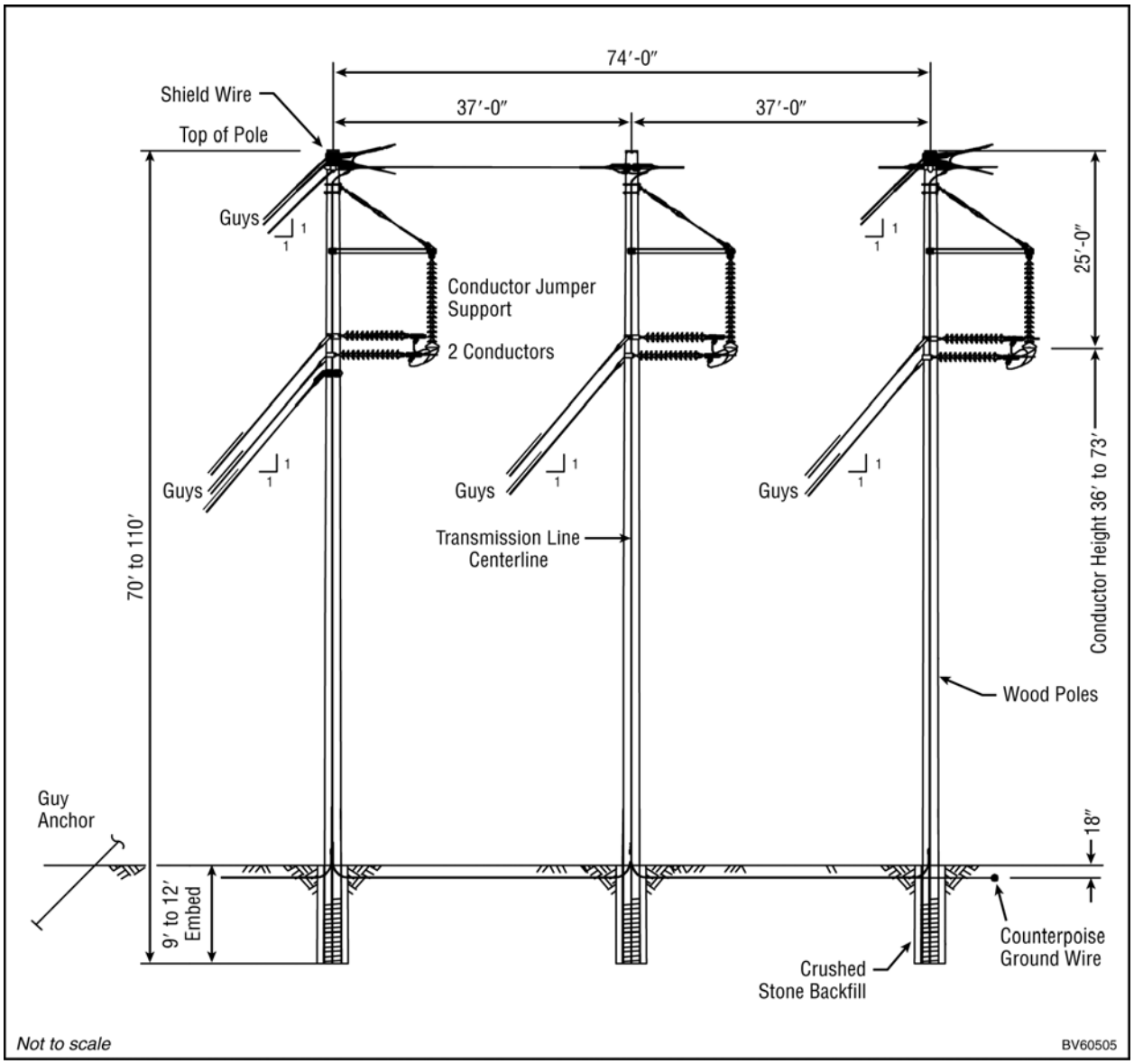

FIGURE 2.3-5 Wood-Pole Dead-End Support Structure (Source: Paquette 2005l)

Where the transmission line would be immediately adjacent to an existing cleared ROW or road, the required ROW width would be reduced on the side where the ROWs or road would be adjoining. Where the transmission line would parallel an existing transmission line, the ROW width would be based on the requirement of MEPCO to maintain a minimum of 100 ft (30.5 m) of separation between the centerlines of the two transmission lines (Figure 2.3-9). The distance to the edge of the opposite side of the ROW would be the required 85 ft (25.9 m). Where the M&N gas pipeline would be located between the two transmission lines, the centerline separation between the transmission lines would be 125 ft (38.1 m) (Figure 2.3-10).

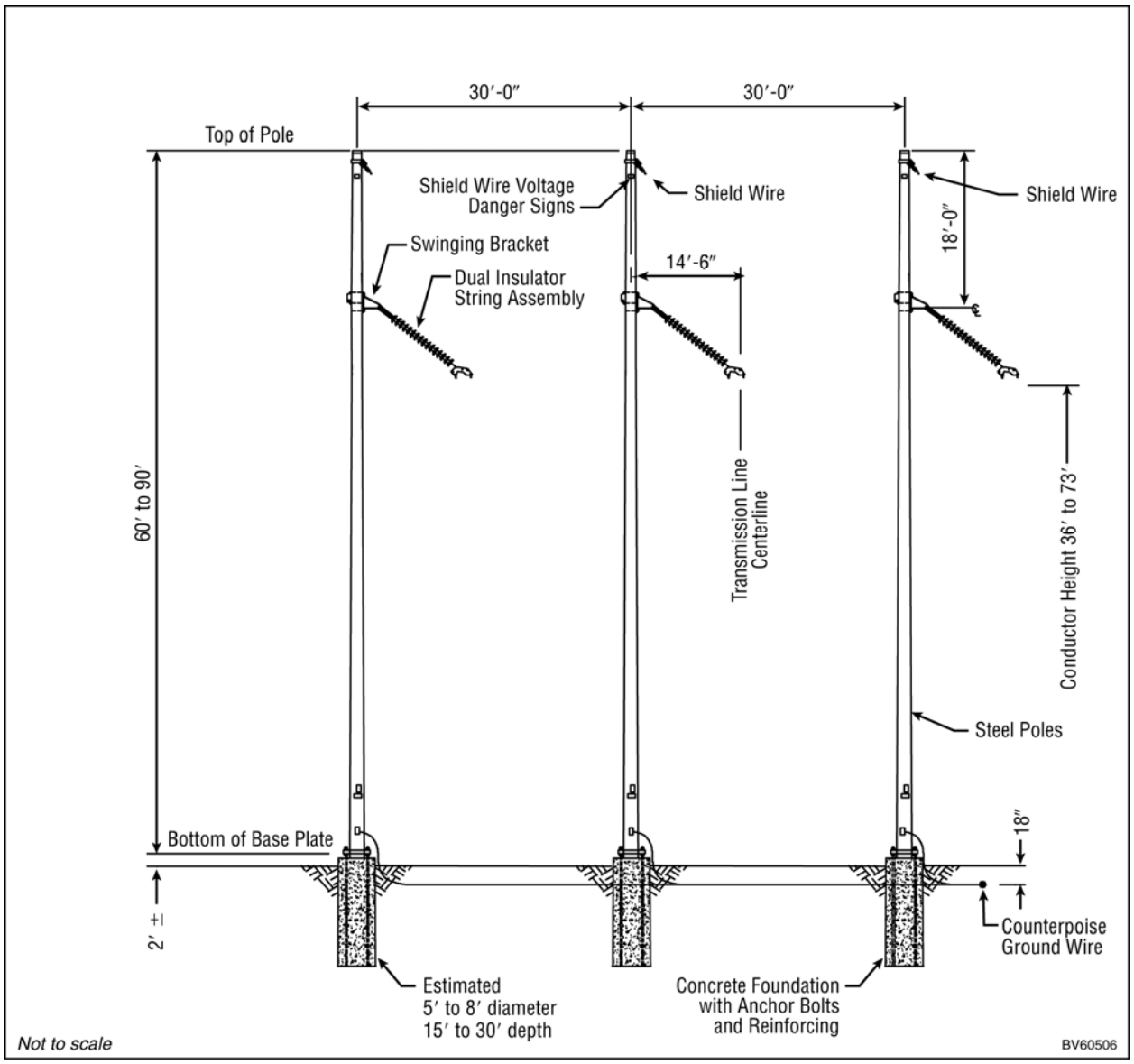

FIGURE 2.3-6 Heavy-Medium Angle Steel-Pole Support Structure (Source: Paquette 2005l)

Where the M&N gas pipeline or Stud Mill Road would be paralleled, the proposed transmission line ROW width would average 155 ft (47.2 m). This situation would occur whenever the NRI would parallel the M&N gas pipeline (Figure 2.3-11), parallel first the M&N pipeline and then Stud Mill Road (Figure 2.3-12), or parallel first Stud Mill Road and then the pipeline (Figure 2.3-13). This dimension is based on the requisite half-width of 85 ft (25.9 m) from the transmission line centerline to the forested side of the ROW and 70 ft (21.3 m) between the centerline of the transmission line and the edge of the pipeline ROW or Stud Mill Road (BHE 2005). Table 2.3-2 lists the lengths and percentages of the ROWs for the alternative routes that would be either a new ROW or adjacent to an existing ROW. The table also provides the total area within each alternative route.

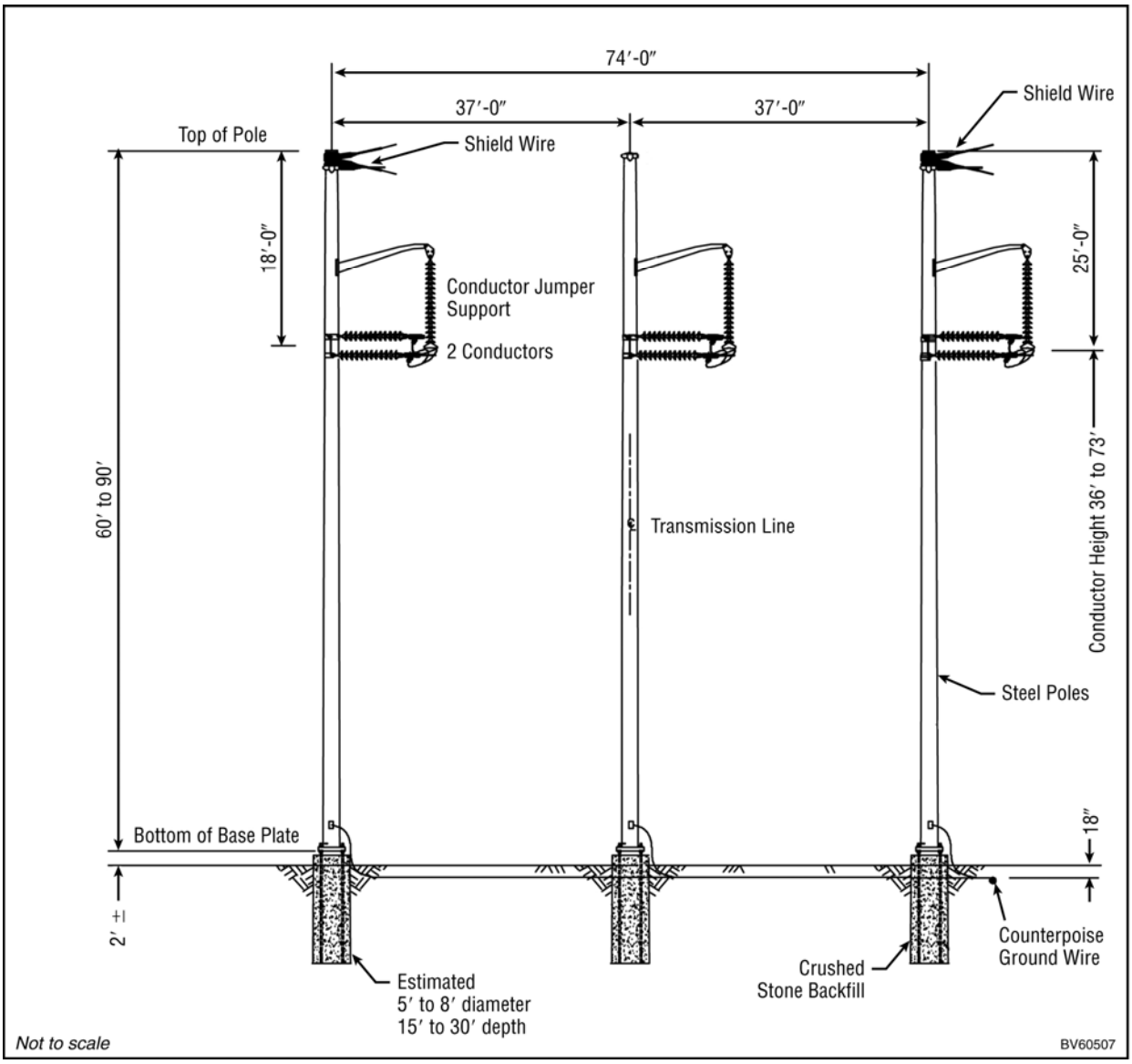

FIGURE 2.3-7 Steel-Pole Dead-End Support Structure (Source: Paquette 2005l)

2.3.3 Substation Alterations

Alterations to four substations within Maine would be required regardless of the alternative route selected (Paquette 2005m). The substations to be modified would be the Orrington Substation located in Orrington, the Maxcys Substation located in Windsor, the Gulf Island Substation located in Lewiston, and the Kimball Road Substation located in Harrison (Figure 1.1-1). Required changes to each substation are described below.

The Orrington Substation would require modifications both inside and outside the current fenced boundary. Modifications within the existing fence line would include the relocation of an

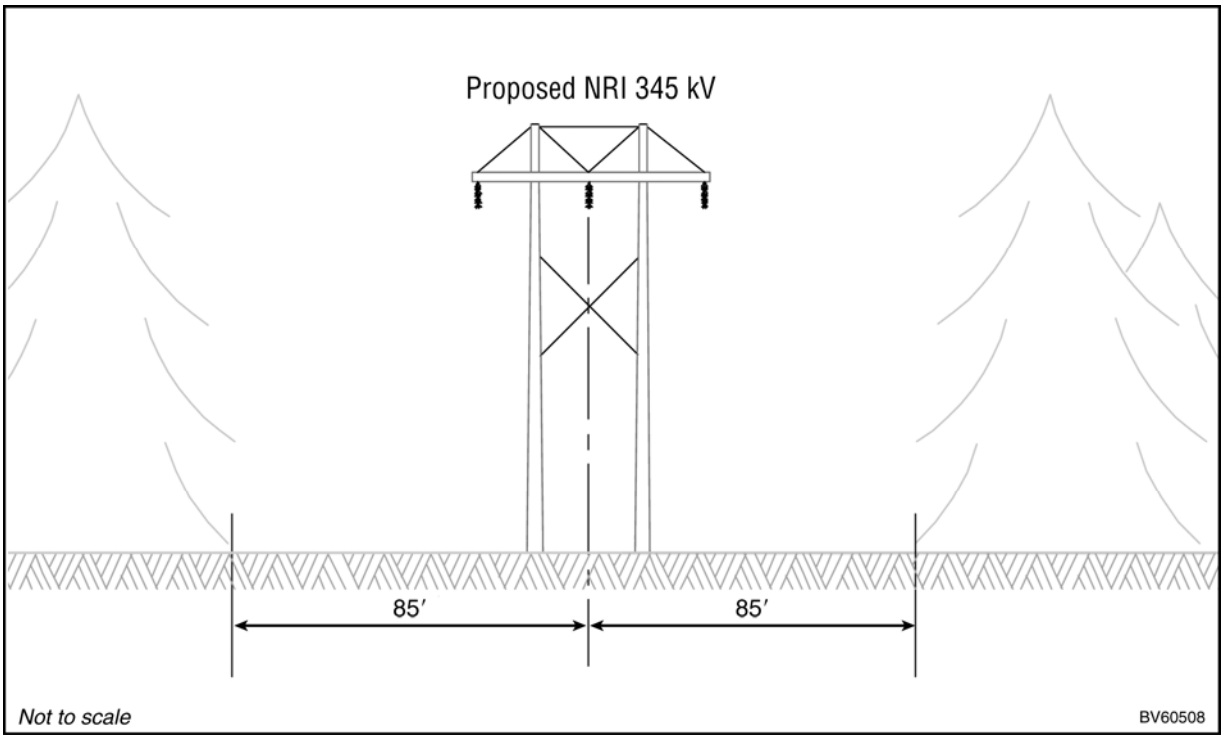

FIGURE 2.3-8 Placement of the NRI within a New ROW (Source: Paquette 2005a)

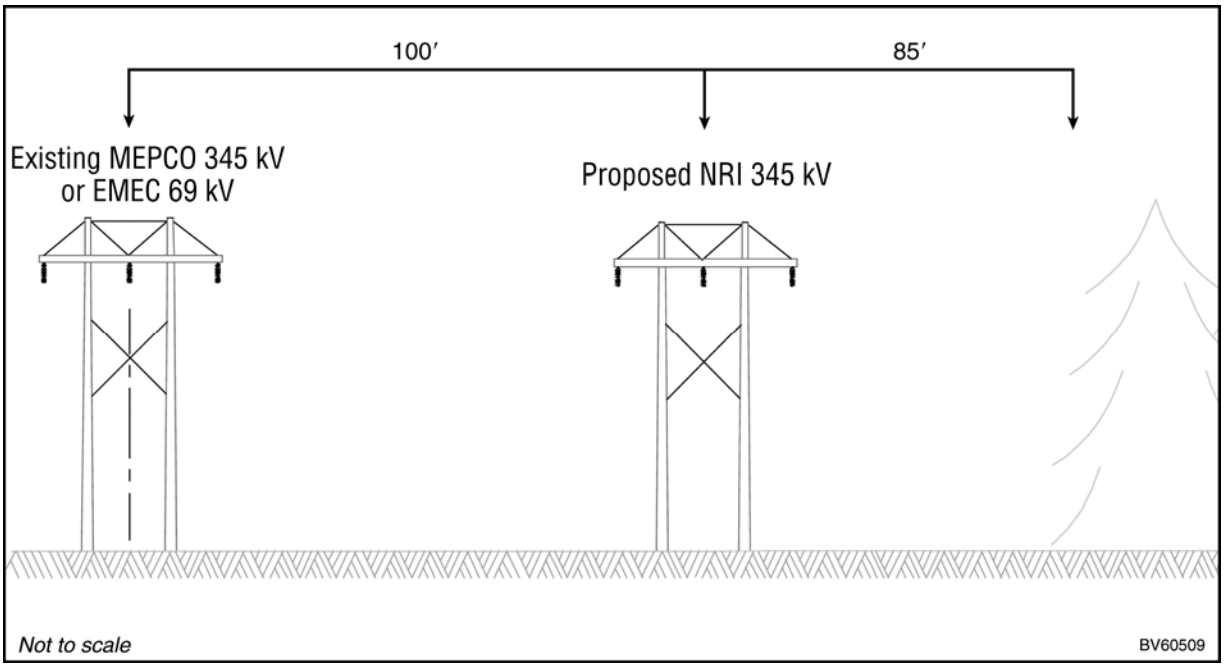

FIGURE 2.3-9 Placement of the NRI Adjacent to an Existing Transmission Line (Source: Paquette 2005a)

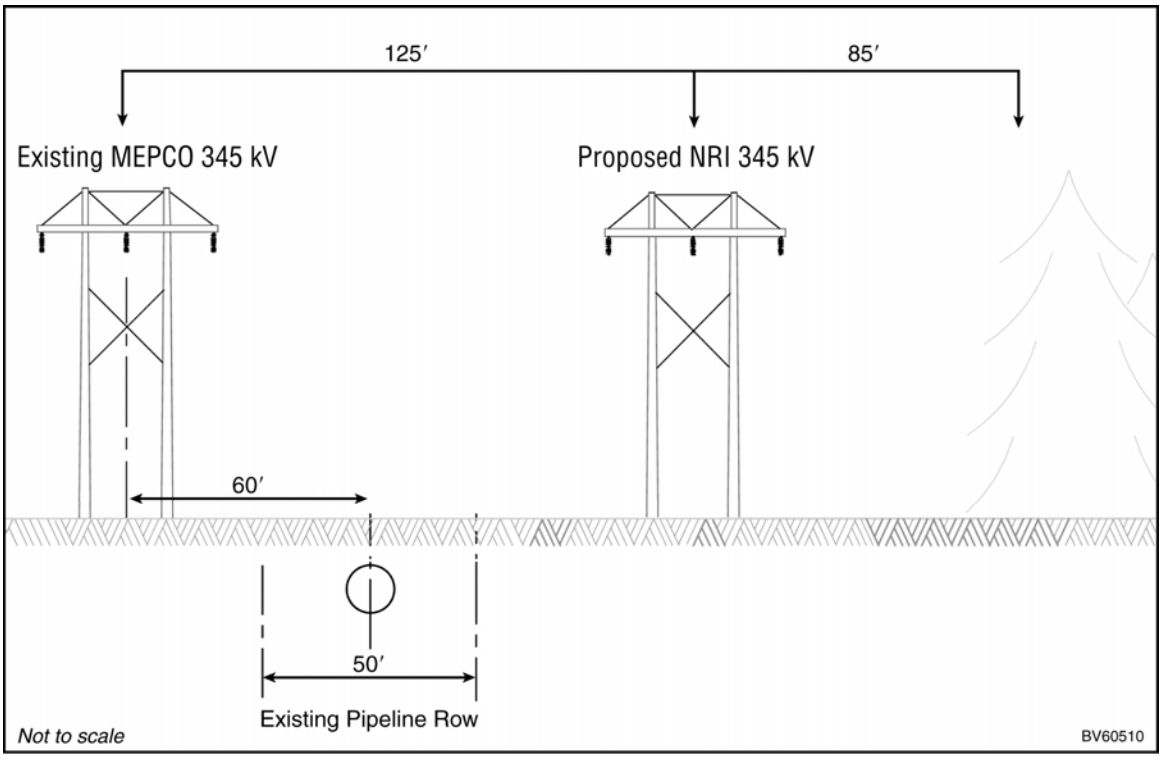

FIGURE 2.3-10 Placement of the NRI Adjacent to the Gas Pipeline and MEPCO Transmission Line (Source: Paquette 2005a)

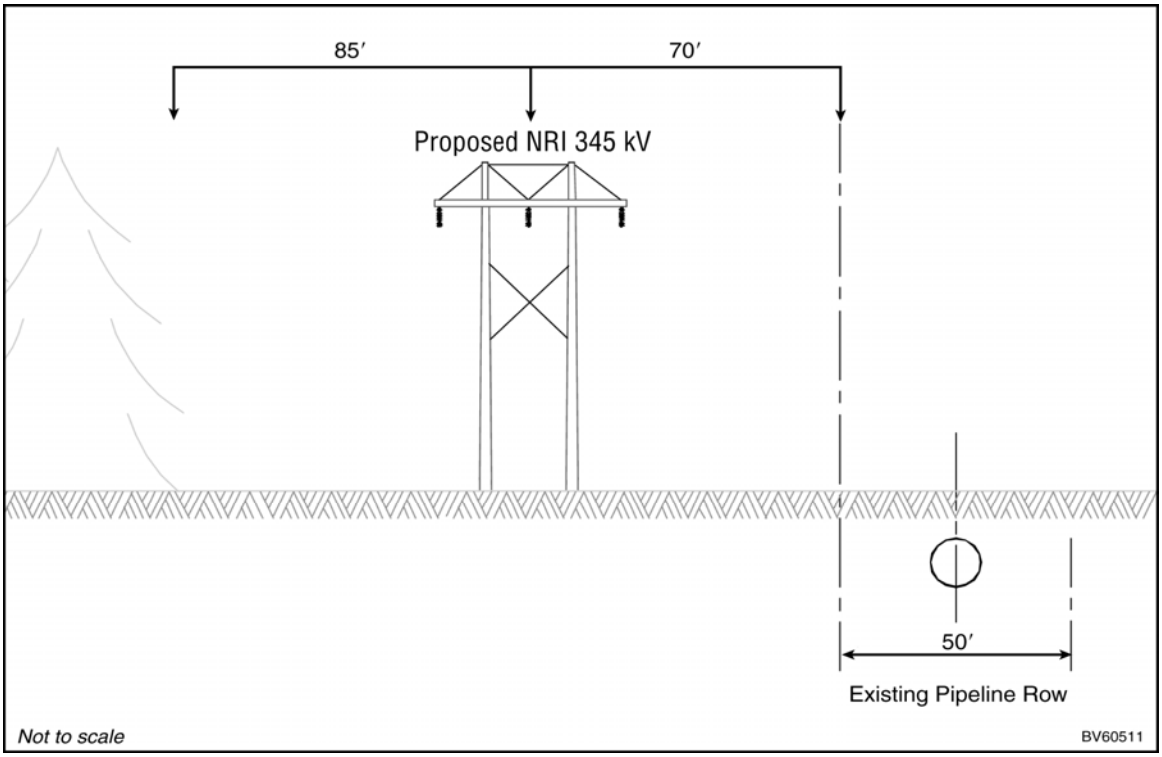

FIGURE 2.3-11 Placement of the NRI Adjacent to the Gas Pipeline (Source: Paquette 2005a)

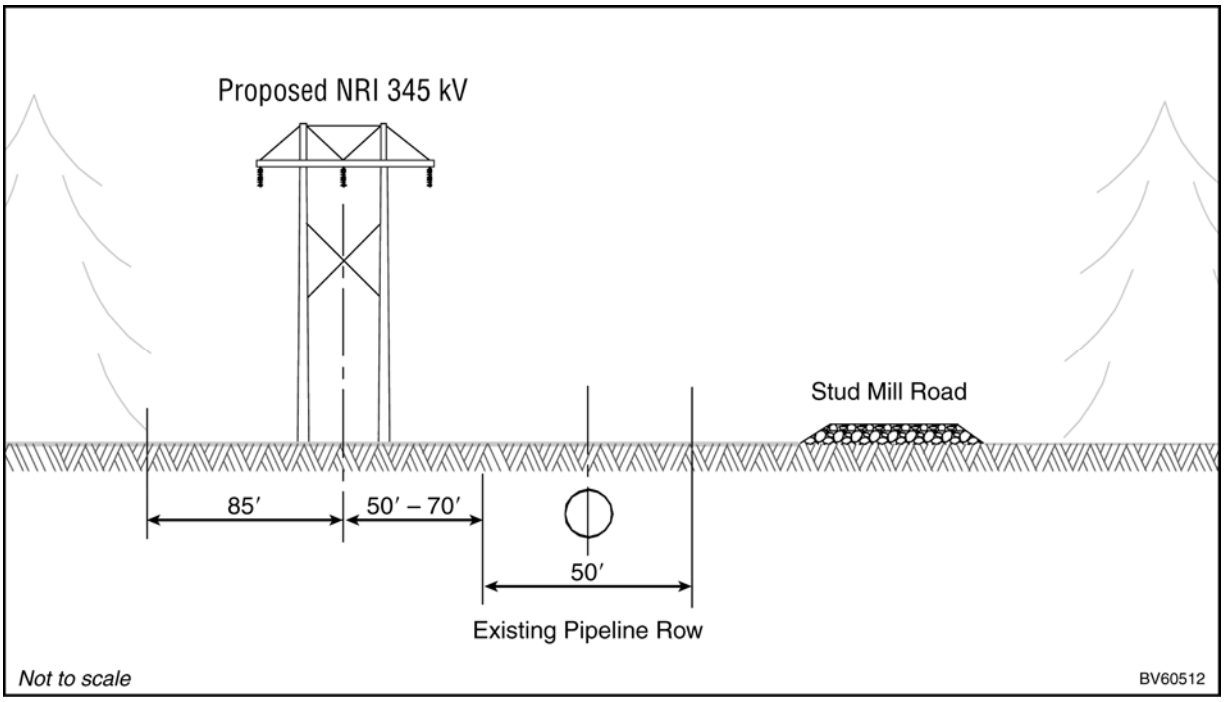

FIGURE 2.3-12 Placement of the NRI Adjacent to the Gas Pipeline and Stud Mill Road (Source: Paquette 2005a)

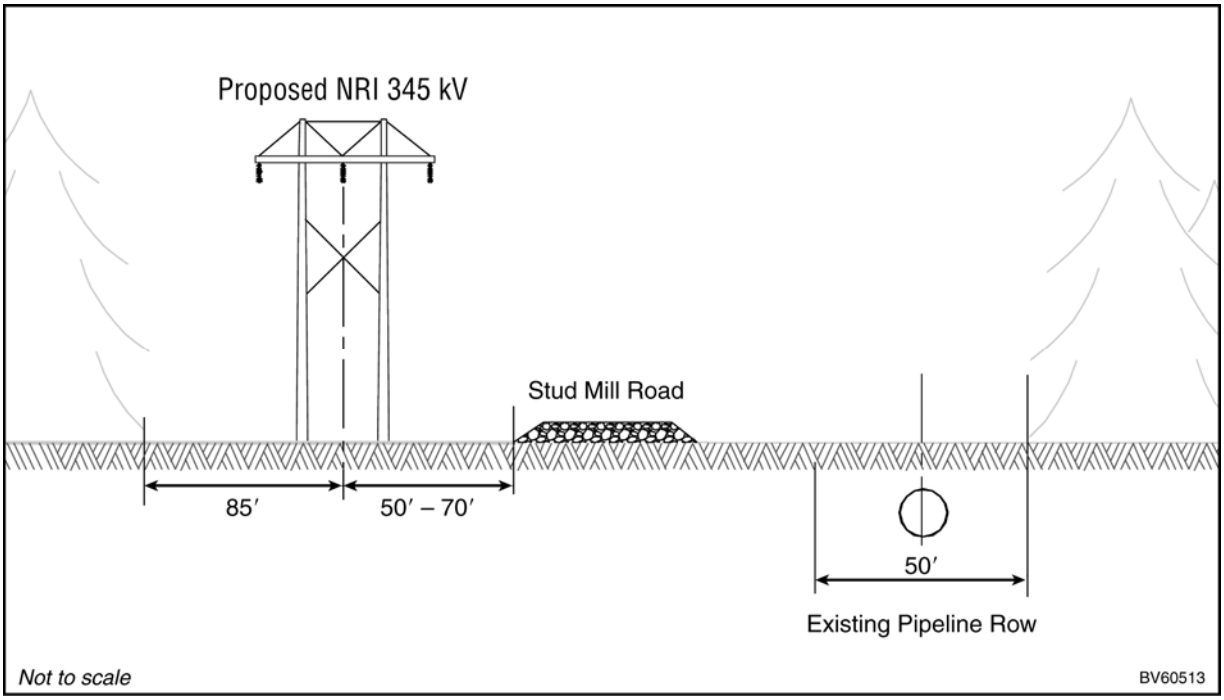

FIGURE 2.3-13 Placement of the NRI Adjacent to Stud Mill Road and the Gas Pipeline (Source: Paquette 2005a)

TABLE 2.3-2 Summary of NRI ROW Requirements by Alternative

Requirement	Alternative[a] MCCR	CCR	PPR	MSR
ROW length (mi)[b,c]				
Total line	85	85	84	114
ROW configuration (mi)				
New ROW (170 ft wide[d])	15 (18%)	2 (2%)	62 (74%)	39 (35%)
Adjacent to M&N gas pipeline and/or Stud Mill Road (155 ft wide)	58 (68%)	68 (80%)	10 (12%)	0 (0%)
Adjacent to MEPCO line (100 ft wide)	5 (6%)	8 (10%)	5 (6%)	47 (41%)
Adjacent to M&N gas pipeline and MEPCO line (125 ft wide)	7 (8%)	7 (8%)	7 (8%)	7 (6%)
Adjacent to the EMEC[e] 69-kV line (100 ft wide)	0 (0%)	0 (0%)	0 (0%)	21 (18%)
Total ROW area (acres)	1,566	1,522	1,633	1,734

[a] CCR = Consolidated Corridors Route, MCCR = Modified Consolidated Corridors Route, MSR = MEPCO South Route, PPR = Previously Permitted Route.

[b] Values rounded to nearest whole mile, acre, or percent. Percentage values are percent of total ROW length.

[c] To convert miles to kilometers, multiply by 1.609; to convert feet to meters, multiply by 0.305; to convert acres to hectares, multiply by 0.405.

[d] Maximum width of new clearing required.

[e] EMEC = Eastern Maine Electric Cooperative.

Source: Paquette (2005j).

existing line, the addition of breakers and associated disconnect switches, the addition of a new dead-end structure and other miscellaneous components, and the expansion of the existing control house. The proposed project would also require the addition of series compensation on the line south of the substation. The construction of two short gravel access roads and the modification of an existing retention pond would be conducted outside the existing fence line (BHE 2005). These modifications would require approximately 0.8 acre (0.3 ha) of new substation area.

The Maxcys Substation would require the replacement of an existing breaker. This change would occur within the current fence line. The existing breaker would need to be replaced with a breaker of higher short-circuit current rating. The Gulf Island Substation would require a new capacitor bank within the current fence line. The Kimball Road Substation would also require a new capacitor bank. However, this would require a 0.2-acre (0.09-ha) expansion of the existing substation.

2.3.4 Transmission Line Construction

The construction of the NRI, including ROW clearing and installation of the structures, would be performed by independent contractors under close daily supervision by BHE engineering and environmental inspectors to ensure that work is performed as specified by permit and regulatory conditions and construction specifications. The general sequence of activities would be surveying; construction of access roads; ROW clearing; and support structure installation, framing, and stringing.

2.3.4.1 Surveying

The first operation to be completed would be a survey of the selected route. Surveying would establish the centerline and edges of the ROW. Generally, only a survey crew and small items of survey equipment would be required during this phase of the project. Establishing the centerline could require limited cutting of trees for line-of-sight staking, profiling, and distance measuring. Existing roads would be used to obtain access to the selected route. Most of the surveying work would proceed cross-country and on foot.

2.3.4.2 Construction of Access Roads

To the extent possible, existing roads would be used to gain access to project construction sites. The extensive network of timber haul roads that traverses much of the project area is one reason the applicant prefers the Modified Consolidated Corridors Route. In addition, the existing MEPCO corridor allows access to the initial 12.2 mi (19.6 km) of any of the alternative transmission line routes and would eliminate the need to construct new access roads within that area.

No new permanent access roads would be required for construction or maintenance of any of the alternative transmission line routes. However, some new temporary access roads would be required to reach the ROW construction area from existing roads. The new temporary access roads would be required primarily for installation of support structures, with some access roads constructed to facilitate the hauling of material from the ROW as part of clearing operations. It is preferable that there be at least one point of access for each 1.0 mi (1.6 km) along the route. The applicant assessed new temporary access roads by using mapped features, such as proximity to nearest major roadway and topography. Where the alternative routes would parallel existing roads (e.g., Stud Mill Road) or are crossed by public roads, few new access roads would be required. A width of 20 ft (6.1 m) was assumed for new temporary access roads (BHE 2004). The approximate clearing required for new temporary access roads would be as follows: Modified Consolidated Corridors Route — none; Consolidated Corridors Route — none; Previously Permitted Route — 21 acres (8.5 ha); and MEPCO South Route — 32 acres (13 ha) (BHE 2004, 2005).

2.3.4.3 ROW Clearing

Trees would be cleared within the ROW only where necessary in order to facilitate (1) staking, access, assembly, and erection of structures; (2) installation of conductors and shield wires; (3) provision of adequate clearance for energized lines; and (4) maintenance. Low-growth woody vegetation would be left undisturbed where possible. The clearing program would be planned and implemented to encourage growth of low-growing native plants that would both stabilize the ROW against erosion and minimize the growth of trees.

Because about 90% of each of the alternative ROWs is forested (including forested wetlands), vegetation clearing can be generally categorized as (1) clear-cutting or (2) several types of selective cutting. In addition to ROW clearing, danger trees (trees that could pose a threat to the operation of the line if they grew or fell into the conductor security zone before the next cutting cycle) would be cleared outside of the designated ROW. Generally, trees would be cut to 6 in. (15 cm) above the ground within cleared sections of the ROW. All logs would be removed from the ROW, while stumps would be removed only from support structure sites and from some temporary access road areas.

The applicant's normal cutting practice in forested areas would be used. First, the appropriate environmental safeguards would be established in the area to be cleared, primarily by placing appropriate erosion control measures to the extent practicable (TRC 2005a). Trees would then be cut. Clear-cutting involves the manual or mechanical cutting of all trees within the ROW. Low-growing shrubs and brush would be left to the extent practicable. All vegetation cut during initial clearing would be cleaned up and disposed of in accordance with the Maine Slash Law (BHE 2005). As part of land-clearing operations, much of the merchantable wood materials (e.g., sawlogs and pulpwood) would be salvaged. Tops of trees, cull material, and branches could be chipped on site and the chips hauled to local power plants for use as fuel. Trees less than 2 in. (5 cm) in diameter may be left on site to deter the formation of new drainage channels in areas susceptible to erosion. In areas of low erosion potential, such trees may be windrowed (i.e., heaped up as if by the wind) or mulched. Methods of handling cut trees and other woody materials are discussed as standard mitigation practices in Section 2.4. Following cutting and removal of the timber, the tree stumps of deciduous species may receive a basal application of approved herbicide applied by a low-pressure backpack applicator.

Table 2.3-3 summarizes the clearing and cutting practices that would be conducted within the ROW, including various types of buffers. Figure 2.3-14 illustrates the vegetation clearing and maintenance along the NRI.

Because of the limited reach of feller bunchers,[7] three access ways would be required within the 75-ft (23-m)-wide water body buffers. They would enable large trees across the ROW to be cut and removed with minimal additional ground disturbance and damage to remaining

[7] A feller buncher is a large logging machine similar to a backhoe with an attachment that cuts trees in place of a shovel. It consists of a standard heavy-equipment base with a tree-grabbing device equipped with a saw or other device at the bottom that cuts the tree off at the base and places it on the stack of cut trees.

TABLE 2.3-3 Summary of Clearing and Cutting Practices during ROW Construction and Maintenance

Location	Buffer Width	Clearing and Cutting during Construction[a]	Cutting during Maintenance[a]
Typical ROW areas with no restrictions	Not applicable	Cut at ground level all vegetation >2 in.[b] in diameter at breast height; remove or top[c] all other vegetation that is 8 to 10 ft[b] or taller.	Cut at ground level all capable trees that are 8 to 10 ft or taller; top all other vegetation that is 8 to 10 ft or taller.
Standard stream buffers where NRI parallels the existing MEPCO 345-kV line	25 ft on each side of the water body	Cut at ground level all capable trees[d] that are 8 to 10 ft or taller; no other vegetation is cut.	Cut at ground level all capable trees that are 8 to 10 ft or taller; no other vegetation is cut.
Standard stream buffers where NRI does not parallel the existing MEPCO 345-kV line	75 ft on each side of the water body	Cut at ground level all capable trees that are 8 to 10 ft or taller; no other vegetation is cut.	Cut at ground level all capable trees that are 8 to 10 ft or taller; no other vegetation is cut.
Atlantic salmon stream buffers	75 ft on each side of the water body	Top all capable trees that could grow to within 15 ft of a conductor in the next 3 to 4 years; no other vegetation is cut.	Top all capable trees that could grow to within 15 ft of a conductor in the next 3 to 4 years; no other vegetation is cut.
Visual buffers at the Narraguagus, Machias, and St. Croix Rivers	Varies from 75 to 500 ft	Top all capable trees that could grow to within 15 ft of a conductor in the next 3 to 4 years; no other vegetation is cut.	Top all capable trees that could grow to within 15 ft of a conductor in the next 3 to 4 years; no other vegetation is cut.

[a] Dead or danger trees are removed at any time.

[b] To convert inches to centimeters, multiply by 2.54; to convert feet to meters, multiply by 0.305.

[c] The tree would be cut at ground level if topping would not leave sufficient foliage to sustain the tree.

[d] Capable trees are those that could grow within the conductor clearance zone before the next management cycle.

Source: BHE (2005).

vegetation that would otherwise occur if the trees were hand cut and dragged out of the buffer with a cable (BHE 2005). One access way would be located at about the middle of the ROW and each of the other two would be located about halfway between the middle access way and an edge of the ROW. The access ways would be 10 to 12 ft (3 to 4 m) wide. The stream buffer access ways would differ from temporary access roads in that within the access ways, only trees that would prevent the harvesting equipment from performing its job or that would otherwise be seriously damaged by the equipment traveling along the access way would be removed. Also,

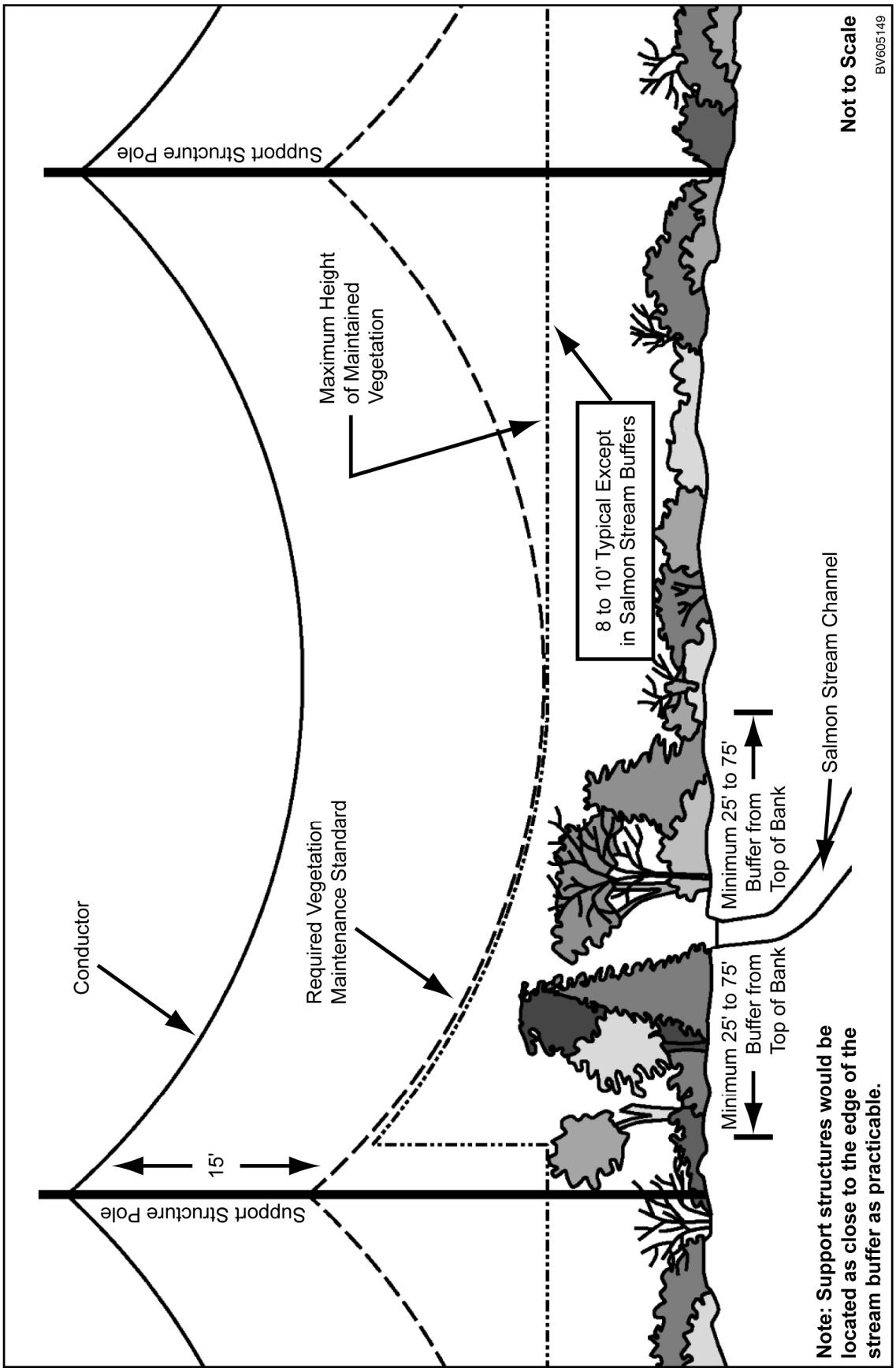

FIGURE 2.3-14 Specifications for Vegetation Clearing and Maintenance along the Proposed ROW (Source: TRC 2005a)

access ways would not require grading or the addition of any surfacing materials such as gravel (BHE 2005). The access ways would not extend closer than 25 ft (7.6 m) to the edge of the stream banks. The two outer access ways would be restored at the completion of clearing activities, while the central access way would be restored at the end of all construction activities in the area. The outer access ways would be allowed to revert to their original state (within maintenance requirements), while the middle access way would be maintained as low-growing vegetation to allow small vehicle access during ROW vegetation maintenance (BHE 2005).

2.3.4.4 Support Structure Installation, Framing, and Stringing

To accommodate installation of each support structure, a work area about 100 ft (30.5 m) wide and 170 ft (51.9 m) long, or 0.4 acre (0.16 ha), would be cleared of all woody growth except low shrubs and brush. All small woody plants would be removed from the immediate structure locations. The structural components would be placed in these work areas in preparation for construction and installation of the support structures. The support structures would be assembled on the ground and erected by a crane with a long boom.

Holes for support structure poles would be made with an auger or backhoe. Some blasting might be required if bedrock occurred at structure locations or, more rarely, for breaking or moving large boulders that restricted access by construction equipment (BHE 2005).

H-frame wood-pole structures would be directly embedded in the ground. A 9- to 12-ft (2.7- to 3.7-m)-deep foundation hole would be excavated at each pole location, and backfill would be placed around the pole after installation. Guy anchors for the wood-pole angle and dead-end structures would consist of steel anchor rods connected to a log buried in a trench about 7 ft (2.1 m) deep. Total construction time for a wood-pole support structure would be less than 1 day.

Steel-pole support structures could also be directly embedded in a similar manner except that some would be backfilled with concrete. They could also be installed on concrete bases, depending on site conditions. Foundation holes would be up to 30 ft (9 m) deep. Total construction time would be less than 4 days per steel-pole support structure.

After the support structures were in place, insulators would be installed and aerial shield (ground) wires and conductors strung. Conductors and shield wires would be pulled through the stringing blocks by tensioning equipment to keep them from coming in contact with the ground or other objects that could cause damage.

2.3.4.5 Construction Staging Areas

The same five staging areas (i.e., construction headquarters along the route where materials are received, stored, and shipped to the ROW) would be used during construction of the line along the Modified Consolidated Corridors Route, the Consolidated Corridors Route, or the Previously Permitted Route (BHE 2004, 2005; Paquette 2005b,f,g,bb,dd; Sloan 2005b). The

following staging areas would be used: Route 178, Costigan Mill, Pickerel Pond, Machias River, and Huntley Brook Staging Areas. The Route 178 and Costigan Mill Staging Areas, along with the Chester, Topsfield, and Baileyville Staging Areas, would be used for the MEPCO South Route. Each staging area would be located adjacent to established roads with easy vehicle access. The staging areas have been previously disturbed by clearing, gravel pit operations, or for use as a staging area for commercial forestry practices or for construction of the M&N gas pipeline (BHE 2005). Only minimal vegetation clearing and light grading would be required within the staging areas (BHE 2005). These construction staging areas are described below. Descriptions of the staging areas for the MEPCO South Route are then presented. Figure 2.1-1 shows the locations of the staging areas.

2.3.4.5.1 Route 178 Staging Area. This site is about 9 mi (14.5 km) northeast of the Orrington Substation. It is located on the west side of State Route 178 in Bradley north of the entrance to the Penobscot Experimental Forest (Figure 2.1-1). The site area consists of about 5 acres (2 ha) of cleared and disturbed land.

2.3.4.5.2 Costigan Mill Staging Area. This 20-acre (8-ha) staging area would be located at a large industrial site located in Penobscot County, Maine, near the Town of Milford and the Community of Costigan (Figure 2.1-1). The industrial site is a former sawmill operation that produced softwood lumber from the early 1970s until it was closed in 2001. Most of the equipment has been removed, and some of the buildings have been demolished. There are no active operations at this time. The site consists of flat to gently rolling terrain; the primary surface material is filled and graded gravel. There are also areas of paved surface. The site has good drainage management, including a new retention pond. It is accessed by paved and gravel roads and has a functional railroad spur. The Costigan Mill Staging Area would be used for rail unloading and storage of utility materials (e.g., poles and wire).

2.3.4.5.3 Pickerel Pond Staging Area. This staging area, located at an abandoned air strip, is located near Pickerel Pond and is adjacent to Stud Mill Road (Figure 2.1-1). The site, which primarily consists of broken pavement and gravel, encompasses about 6 acres (2.4 ha).

2.3.4.5.4 Machias River Staging Area. This staging area would consist of about 6.5 acres (2.6 ha) of land along Stud Mill Road, about 0.25 mi (0.4 km) west of the Machias River (Figure 2.1-1). This former work-camp site is presently cleared. About 1 acre (0.4 ha) of the staging area is located north of Stud Mill Road; the remainder is south of it. This section was formerly used as a maintenance facility.

2.3.4.5.5 Huntley Brook Staging Area. This site is located near where Stud Mill Road crosses Huntley Brook (Figure 2.1-1). About 4.5 acres (1.8 ha) of presently cleared land would be used.

In addition to the Route 178 and Costigan Mill staging areas, the following areas may also be used for the MEPCO South Route.

2.3.4.5.6 Chester Staging Area. This 10-acre (4-ha) site is an inactive chip-burning facility in Chester, Maine. The plant has been dismantled and has a large yard for chip storage. The area is located near both proposed river crossings of the Penobscot River (Figure 2.1-1).

2.3.4.5.7 Topsfield Staging Area. This 6-acre (2.4-ha) site is the location of an old hayfield. The site is located along Route 1 and Route 6, the major transportation corridors in the region (Figure 2.1-1).

2.3.4.5.8 Baileyville Staging Area. This staging area, located near the terminus of the line, consists of two parcels, one of 16 acres (6.5 ha) and one of 28 acres (11.3 ha) (Figure 2.1-1). The staging area is the site of a now-closed oriented strand board mill. Each parcel has two large yards that can easily accommodate poles and other equipment.

2.3.5 Installation of AC Mitigation for the M&N Gas Pipeline

Any time a wire carrying AC is in the vicinity of a metal pipeline, the wire has the potential of inducing voltages in the pipeline.

The three means by which voltages from a transmission line could be induced in a pipeline are as follows:

- Electrostatic coupling (capacitive coupling) can be caused by the electrostatic field surrounding the energized line (conductor). This is of primary concern when a pipeline is under construction near an overhead transmission line.

- Electromagnetic coupling (transformer action) occurs when a current flows in an energized conductor. It produces an electromagnetic field at right angles to the conductor. When electromagnetic lines of force cut through another conductor (such as the pipeline), a voltage is induced in that conductor. These voltages (touch voltage) can be hazardous to anyone who comes in contact with the pipeline or appurtenances, and the voltages could potentially damage the pipeline or related facilities.

- Resistive coupling can occur during fault conditions on the transmission line. If lightning strikes an energized conductor, the resulting voltage rise will exceed the breakdown insulation level of the insulator at the nearest support structure. A flashover will occur from the conductor to the support structure and then to the structure ground, creating a fault current for a fraction of a

second. The fault current would radiate from the ground near the support structure and could flow in the pipeline (Kirkpatrick 1995).

The last two items above could be a concern wherever the NRI would be located near (e.g., within 1 mi [1.6 km]), or parallel to, or would cross over the M&N gas pipeline. Therefore, AC mitigation would be required to protect worker and public safety as well as to minimize potential impacts on the integrity of the pipeline facilities (induced voltages can reduce the effectiveness of the cathodic [corrosion] protection employed by the pipeline). Key factors considered in the analysis of AC mitigation that could be required for the M&N gas pipeline include (1) design style and alignment of the transmission line, (2) steady-state and fault current levels in the transmission line, (3) desired distance from the pipeline, (4) electrical properties of the soil, and (5) specifications and design of the pipeline. The applicant uses the Current Distribution, Electromagnetic Fields, Grounding and Soil Structure Analysis software package, the internationally recognized computer model developed by Safe Engineering Services and Technologies, Ltd. (2005), to analyze both fault and steady-state conditions and to test the effectiveness of various mitigation solutions in order to assist Maritimes in the design of an AC mitigation plan for co-location of the NRI and M&N gas pipeline.

The AC mitigation technique under consideration for the M&N gas pipeline includes the installation of a zinc ribbon buried about 1.5 ft (0.5 m) deep above and parallel to the existing unprotected pipeline, the top of which is at least 3 ft (1 m) below the ground. The trench for the zinc ribbon would be created by either plowing or excavation. Following installation of the zinc ribbon, the trench would be backfilled. The ribbons would be attached to the pipeline at regular intervals (e.g., every 1,000 to 5,000 ft [305 to 1,524 m]). It is expected that the zinc ribbon would be installed wherever the NRI would be located near, or parallel to, or would cross over the M&N gas pipeline. Approximately 68 mi (109 km) of zinc ribbon would be required for the Modified Consolidated Corridors Route, Consolidated Corridors Route, or Previously Permitted Route, while about 45 mi (72 km) of zinc ribbon would be required for the MEPCO South Route (Paquette 2005mm,nn). However, the ribbon would be discontinuous in that it would not be installed where the existing pipeline crosses streams (Paquette 2005ee).

In addition to the zinc ribbon, ground mats would be installed at existing test stations along the pipeline. These stations, which resemble pipeline markers in appearance, are spaced at intervals of about every 1 mi (1.6 km) and are located directly above the pipeline. Ground mats would consist of a grounding material (e.g., coiled zinc ribbon) and crushed rock over an area up to 12 ft (3.7 m) in diameter around each test station. About 68 test stations would require ground mats for the Modified Consolidated Corridors Route, Consolidated Corridors Route, or Previously Permitted Route; the MEPCO South Route would require about 45 ground mats. In addition, four pipeline valve sites and the Baileyville Compressor Station would require some additional grounding. The edge of the NRI ROW would be greater than 150 ft (46 m) from the valve sites. The AC mitigation would be installed prior to energizing the NRI (Paquette 2005ee).[8]

8 Maritimes would be responsible for overseeing the design, environmental permitting, procurement of materials, and installation of the AC mitigation (Paquette 2005mm).

2.3.6 Post-Construction Maintenance Practices

Post-construction maintenance would consist primarily of line inspection and vegetation management. Failure to adequately control vegetation within transmission line ROWs has been identified as a major cause of the August 14, 2003, electric power blackout in the eastern United States and has contributed to other regional outages in the past (FERC 2004). Growth rates of vegetation can vary due to differences in species, soil, site conditions, and climate conditions. Therefore, ROW inspections would be required periodically to determine if there are areas where trees may approach minimum clearances before the next scheduled vegetation maintenance period. Management of vegetation along the ROW would consist of removal of danger trees adjacent to the ROW and control of vegetation within the ROW. Management of vegetation within the ROW would involve use of an integrated vegetation management approach designed to encourage low-growing plant species and discourage tall-growing vegetation (TRC 2005b). The vegetation maintenance plan would ensure a minimum distance of 15 ft (4.6 m) between any object and the conductor during all phases of the maintenance cycle (BHE 2005).

Maintenance clearing generally would be performed on a 3- to 4-year cycle and would consist of some of the same types of activities as during the initial clearing. The post-construction vegetation management would include the following: (1) areas of selective clearing (e.g., riparian buffer zones, wetlands, areas near rare and uncommon natural areas, and areas containing special status species or other wildlife species of concern); (2) areas of side clearing along the edge of the ROW (e.g., removal of danger trees); and (3) areas of cutting and spraying within the ROW. (Buffer zones are protected areas of land along water bodies or wetlands that have sufficient width to reduce the movement of eroded soil or to maintain adequate shading.) ROW maintenance within buffer zones would be limited to cutting only those trees that could present a safety hazard to the transmission line before the next cutting period (4 years). Only the upper portion of evergreen trees that infringe on the wire security zone would be cut. For hardwoods, only those trees likely to reach the bottom limit of the wire security zone within 4 years would be removed. Cutting along the edge of the ROW would involve the removal of encroaching branches from each side of the ROW (i.e., side trimming).

Hand and mechanical vegetation cutting would be combined with optional foliar, basal, and cut-stump application of herbicides to maintain ROW vegetation. Only herbicides registered for use by the EPA, approved for use by the State of Maine, and determined by BHE's experience (or the experience of others) to be effective for foliar, basal and cut-stump applications would be used. Herbicides that may be used include Accord®, Arsenal®, and Krenite® (Paquette 2005r). The active ingredient in Accord is glyphosate. It is used to control grasses, herbaceous plants, brush, some broadleaf trees and shrubs, and some conifers. Glyphosate is absorbed by leaves and moves rapidly through the plant, preventing it from producing an essential amino acid (Information Ventures, Inc. 1995).

The active ingredient in Arsenal is imazapyr. It is used to control annual and perennial grass and broad-leaved weeds, brush, vines, and many deciduous trees. Imazapyr is absorbed by leaves and roots and accumulates within the active growing region of the plant. There it disrupts

protein synthesis and interferes with cell growth and DNA (2′-deoxy-5′-ribonucleic acid) synthesis (Information Ventures, Inc. 1995).

The active ingredient in Krenite is fosamine ammonium, often referred to simply as fosamine. It is used to control and/or suppress woody plants. Applied as a foliar spray, it inhibits bud and leaf formation in the spring. Unlike the other two herbicides, Krenite affects only the parts of the plant that are sprayed; therefore, it can be used as a trimming agent (e.g., to control portions of trees that could otherwise infringe into the ROW and present a safety concern) (Pesticide Management Education Program 2001; Superior Forestry Service, Inc. 2001).

Areas that would receive selective cutting include riparian areas along streams and rivers and forested wetlands. Generally, riparian buffer zones would be 75 ft (23 m) wide on each side of a perennial or intermittent stream but would only be 25 ft (7.6 m) wide for the portion where the proposed project parallels the existing 345-kV line. Wetland buffer zones would extend 25 ft (7.6 m) from the edge of a wetland (BHE 2005). Within riparian and wetland buffer zones, only the vegetation within the actual conductor clearance zone within or immediately adjacent to the ROW would be removed. Table 2.3-3 summarizes the cutting practices that would occur within the various buffers during ROW maintenance. All clearing would be accomplished by hand or feller buncher machinery. No herbicides would be used within riparian and wetland buffer zones (BHE 2005).

About 5% of the clearing required for the alternative routes would be conducted within forested wetlands. ROWs in wetland types other than forested wetlands (e.g., scrub-shrub and emergent wetlands) generally would not require removal of vegetation. To the extent possible, clearing involving use of machinery in wetlands would be performed during the winter when the ground is frozen and snow cover is present. Manual cutting of trees could occur at any time of the year. No herbicides would be used within wetlands with standing water.

Selective cutting would also occur in visually sensitive areas (e.g., certain road crossings and viewpoints) and where known deer wintering areas would be bifurcated by the route. Clearing would leave the maximum amount of vegetation possible within the ROW without infringing on the conductor clearance zone. Construction of access roads and basal application of State-approved herbicides could occur following selective cutting in visually sensitive and deer wintering areas.

2.3.7 Schedule

Construction would begin with ROW clearing upon issuance of all required Federal, State, and local permits. ROW clearing is anticipated to begin in the winter in order to take advantage of frozen ground to minimize impacts, especially within wetlands. It is anticipated that the ROW would require about 6 months, support structures would require 8 months to install, and shield wires and conductors would require 8.5 months to install (Paquette 2005ii). To some extent, these activities could be conducted concurrently, and the use of additional crews could shorten the construction time. Substations would be modified as needed during the same period as the stringing operations. Site-specific mitigation and restoration activities would be carried out

during all phases of construction. Plans call for the project to be completed and the line energized within 12 to 18 months of commencement of construction.

2.4 STANDARD MITIGATION

BHE's standard mitigation practices are documented in its Permit Application for Site Location of Development and Natural Resources Protection Act for the NRI that has been submitted to the MDEP (BHE 2005).[9] The permit application includes the erosion and sediment control plan, post-construction vegetation maintenance plan, and other mitigation measures. The following sections summarize the mitigation practices included in the proposed action. The mitigation practices are listed according to project phase (i.e., pre-construction, construction, site restoration, operation, and maintenance), although there could be overlap among the various phases. In addition to BHE's mitigation practices, Maritimes would follow its established mitigation practices when installing AC mitigation, as required (TRC 2002).

2.4.1 Mitigation Practices To Be Used for Pre-Construction Activities

- Structures would be located to avoid sensitive features such as riparian areas, water courses, and cultural resource sites, or to allow conductors to clearly span the features within limits of standard structure design.

- Before construction, all construction personnel would be instructed on the protection of cultural and ecological resources, including mitigation measures required by Federal, State, and local agencies. To assist in this effort, the construction contract would address (1) Federal and State laws on antiquities and plants and wildlife, including collection and removal, and (2) the importance of these resources and purpose and necessity of protecting them.

- All requirements of those entities having jurisdiction over air quality matters would be adhered to and any permits needed for construction activities would be obtained.

- The applicant would perform an aerial survey in the spring of 2006 to identify any new bald eagle nests that might have become established within 0.25 mi (0.4 km) of the ROW. If new nests are identified, BHE would consult with the Maine Department of Inland Fisheries and Wildlife (MDIFW) and USFWS to determine appropriate mitigation for potential impacts. Typically, disturbance of eagle nests is avoided by prohibiting construction activities within a 0.25-mi (0.4-km) radius of the nests when breeding and nesting activities

9 The standard mitigation practices include best management practices (BMPs). BMPs are guidelines to reduce erosion and sedimentation of water bodies from logging activities. In the unorganized townships of Maine, these guidelines are law, enforced by the Land Use Regulation Commission (LURC).

occur (generally February 1 through May 15; continuing until August 31 if the nest is occupied).

- As appropriate, mitigation measures developed during consultation with the USFWS, NOAA Fisheries, and State and Tribal authorities would be followed.

- If required, the applicant would adhere to mitigation measures developed by NOAA Fisheries regarding essential fish habitat (EFH).

- Proposed access ways within stream buffers and water-wetland crossing locations, as well as other environmentally sensitive areas where activities would be restricted or prohibited, would be flagged and/or would have signs posted.

- Prior to any clearing or construction work in or near any sensitive natural areas, a "walk-through" would be conducted. Attendees at the walk-through would include (1) the contractor, (2) BHE and/or any designated representative, and may include (3) any assigned third-party inspector and/or other agency representatives (e.g., MDEP project manager, Atlantic Salmon Commission representative, or USFWS representative).

- To the extent practicable, BHE would use existing public roads, Stud Mill Road, and other smaller logging roads to access the ROW.

- Wetland and water body crossings would be identified prior to construction to minimize the span of a wetland or stream crossing and to avoid the more environmentally sensitive or wetter portions of a wetland or stream crossing.

- Temporary erosion and sedimentation control measures would be installed prior to ground disturbance, as determined through the site walk-through.

- Silt fence or other erosion control barriers would be installed around the perimeter of the work area, as necessary.

- All erosion control work conducted by a contractor would need to meet the acceptance review of BHE.

- Environmental training would be provided to both BHE and contractor personnel whose activities or responsibilities could impact the environment during construction. The environmental compliance officer and other inspectors, the BHE construction field supervisor(s), and all construction personnel would be expected to play an important role in maintaining strict compliance with all permit conditions to protect the environment during construction.

- Except at the Narraguagus and Machias River crossings, structure locations would be sited as close as possible to the buffer of an Atlantic salmon stream of special concern[10]; or, in the case of a tributary to Fletcher Brook, a taller structure would be used to create a conductor height that would allow for taller vegetation, thus minimizing trimming requirements.

- Structures would be located farther back from the Narraguagus and Machias River crossings to minimize the visual impact from these high-value recreational resources and Outstanding River Segments.

2.4.2 Mitigation Practices To Be Used for Construction Activities

- Blasting would be conducted in general conformance with appropriate Federal guidelines to limit peak particle velocity and ground vibration to safe levels.

- A preblast inspection of privately owned structures within 500 ft (152 m) of any blast site would be conducted, and each affected landowner would be notified about the blasting before it was conducted.

- Appropriate procedures for storage and transportation of blasting equipment and explosive materials, including appropriate signage indicating its location, would be used.

- Noise and air blast effects would be mitigated by the use of proper stemming techniques. No blasting would be conducted on Sundays. On other days, blasting would occur only from 7:00 a.m. to 7:00 p.m. or from sunrise to sunset, whichever was longer. Blasting would be conducted no more than four times per day in any one general location.

- As appropriate, the occurrence of flyrock from blasting would be limited by using blasting mats.

- Employees would be trained to promptly contain, report, and clean up any oil or hazardous material spill in accordance with BHE's spill contingency plan. Both the contractors' and BHE's environmental inspectors would ensure that all personnel working on the ROW follow the oil and hazardous material use requirements.

- Regulated materials would not be released onto the ground or into streams or drainage areas. Totally enclosed containment would be provided for all trash. All construction waste, including trash and litter, garbage, other solid waste,

[10] An Atlantic salmon stream of special concern is a stream or river identified by the Maine Atlantic Salmon Commission as being most important to the various life stages of the Atlantic salmon.

petroleum products, and other potentially hazardous materials, would be sent to a disposal facility authorized to accept these materials.

- Special status species or other species and habitats of concern would continue to be considered during post-EIS phases of project implementation in accordance with management policies set forth by the appropriate government agency. This might entail BHE's conducting surveys for plant or animal species of concern along the proposed transmission line route and associated facilities (i.e., access roads and staging areas) as agreed upon by the USFWS, NOAA Fisheries, MDIFW, MDEP, and BHE. In cases where special status species or other species of concern are identified, appropriate mitigation measures would be taken to avoid adverse impacts on the species and its habitat and may include altering the placement of access roads or support structures as practicable, monitoring construction activities, or implementing seasonal construction restrictions. The project would be designed and constructed in accordance with avian protection guidelines, as referenced in Section 4.5, Ecological Resources.

- Practices such as cleaning of construction equipment to prevent the introduction or spread of invasive species would be developed and followed in accordance with applicable requirements.

- Any new gravel placement and grading would be limited to that necessary to maintain a safe, reliable surface and would not result in any new impervious surface. No gravel would be placed in protected resources such as wetlands.

- The movement of equipment and materials within the transmission line ROW would be confined as much as possible to a single road or travel path.

- All ground-level vegetation and stumps left after cutting would not be removed, unless necessary to install a support structure.

- The support structure construction work area would not be grubbed or cleared of brush, unless leveling of the area was required. The only soil disturbance would be associated with the drilling-excavation of a hole for the installation of poles and, in some cases, with the need to level the work area or provide access along and adjacent to the ROW.

- In all sensitive areas, the pull line would be pulled across the resource by construction personnel walking the line across, to avoid unnecessary crossing of the resource by construction equipment.

- Work within inundated or saturated wetlands would be limited to the winter months (frozen conditions), as much as possible.

- Seepage and runoff from pole excavations would be pumped to a temporary sedimentation trap prior to discharge to a well-vegetated area where the water would be able to infiltrate the soil.

- Recommended widths for filter strips between disturbed areas and water resources would be used. These would range from a minimum of 75 ft (23 m) where there is no slope, to 165 ft (50 m) for a 70-degree slope.

- Construction equipment would not travel straight up or down any slopes with a grade steeper than 10%, except where necessary because of safety concerns and/or terrain constraints.

- Rivers, streams, and wetland areas would be crossed, where necessary, at right angles to the channel and/or at points of minimum impact. Natural drainage patterns would not be altered or restricted as a result of construction.

- If construction in unfrozen wetlands cannot be avoided, wide-tracked or balloon-tired equipment, timber corduroy or timber mat work areas, or sump combination would be required.

- Where support structures would be placed in wetlands, topsoil would be excavated first and stockpiled separate from subsoil. Soils would be replaced into the excavated area in the opposite order they were removed.

- No structures would be located within the 25-ft (7.6-m) or 75-ft (23-m) standard stream buffer areas, and no soil disturbance or vehicular traffic would be allowed other than that necessary to construct and utilize temporary equipment crossing bridges authorized during the walk-through. Cutting in standard stream buffers would be limited to only capable tree species (a tree that may grow into the clearance zone of the conductors within the next 3 to 4 years) that are greater than 8 to 10 ft (2.4 to 3.0 m) tall (dead or danger trees would be removed entirely). Cutting would be performed by hand or by a feller buncher, either by reaching into the buffer from outside the zone or from the three access ways that would be used for the 75-ft (23-m) stream buffer areas. Erosion control would be used, as appropriate.

- Salmon stream buffers would have the same construction limitations as standard stream buffers except that only those trees capable of growing into the clearance zone of 15 ft (4.6 m) from the conductors within the next 3 to 4 years would be topped or removed.

- A number of aboveground structures or techniques would be used to divert water out of access roads and work areas in order to prevent subsequent runoff and erosion. These could include water bars and sediment barriers such as silt fence, hay bales, and/or erosion control mix berms (primarily organic

materials such as shredded bark, stump grindings, composted bark, or similar materials).

- No refueling or maintenance of equipment, including chain saws, would occur within buffer areas.

- Initial clearing of the area surrounding State rare species would be conducted during the winter with at least 6 in. (15 cm) of snow cover. Also, all tree species except young northern white cedar (*Thuja occidentalis*) up to 8 ft (2.4 m) tall would be removed. Vegetation maintenance in these areas would consist of hand cutting all trees other than northern white cedar that are less than 8 to 10 ft (2.4 to 3.0 m) tall. Those trees would be topped when reaching that height. No herbicides would be used within 50 ft (15 m) of these areas, and all cut woody debris would be removed from the ROW to ensure that the plants are not smothered.

2.4.3 Mitigation Practices To Be Used during Site Restoration

- In revegetation efforts, State-approved seed mixes would be used.

- Restoration measures would return the disturbed area to its original contour in order to allow revegetation with shrub and brush cover. The site would be revegetated with temporary and/or permanent seeding, as necessary, to stabilize the area.

- After pole installation, topsoil would be restored to the original surface grade, except where mounding around a structure would be necessary for structure stability.

- Nonstructural measures (hay or straw mulch, erosion control mix, matting, or seeding) would be used to cover exposed soil areas to prevent wind and water erosion. Such measures would be required on all exposed soils within 100 ft (30 m) of water resources within 48 hours of initial soil disturbance or before any predicted storm event. Mulch would also be applied immediately to areas that have been seeded.

- Site restoration would be conducted in a timely manner. Highest priority restoration areas would include, but not be limited to, all wetland and stream crossings; drainage ways or ditches; cut banks and slopes (more than 8%); around substation construction areas; around pole and anchor pole placements; and all temporary access roads, ROW travel lanes, yarding, and construction lay-down areas.

- All soil that would be excavated, mounded, or deposited during construction would be regraded or removed from the site. All regrading and redistribution of soil would be conducted to match existing grade.

- The banks of brooks, streams, and rivers would be restored to natural conditions.

- All construction mats used in wetlands would be removed, and any surface damage would be repaired, as needed.

- All areas severely rutted by construction equipment would be regraded and permanently revegetated.

- All areas of exposed soil would be permanently revegetated or otherwise permanently stabilized.

- Any brush burning would be conducted in compliance with local and State open burning permit requirements.

2.4.4 Mitigation Practices To Be Used during NRI Operation

- If necessary, site-specific landscaping may be put in place in selected areas to provide screening for year-round residents whose property abuts NRI operations. However, maintenance would still follow the standard practice of preventing any vegetation from reaching within 15 ft (4.6 m) of the conductors.

- Shield wires would be marked with highly visible devices, such as colored balls and/or flappers, at key water courses (i.e., the Penobscot River, Great Works Stream, Narraguagus River, Machias River, and St. Croix River, depending on selected route alternative).

- Flappers would also be used where the transmission line crosses through high-value habitat for waterfowl and wading birds, if not adjacent to an existing transmission line.

- BHE would respond to and resolve individual complaints of radio and television interference generated by the transmission line.

- Osprey nests would be allowed to remain in place on support structures unless there is a chance that they would come into contact with the conductor. If there is a risk of arcing or conductor contact, BHE would follow its existing guidelines for removing nests; removal would take place between September 1 and April 15, and only if birds are not actively using the nest. Nests would be relocated to nesting platforms when possible; otherwise, they

would be destroyed when removed. No permit would be required for this action. An annual report on all osprey nests moved or destroyed by BHE would be given to the MDIFW.

2.4.5 Mitigation Practices To Be Used during ROW Maintenance

- A visual screen of trees would be maintained at the Narraguagus and Machias River crossings and on the U.S. side of the St. Croix River crossing. Vegetation maintenance activities would be limited in these areas.

- All vegetation cut during routine maintenance would be cleaned up or otherwise handled in accordance with the Maine Slash Law.

- The following procedures would be implemented during all vegetation maintenance activities using herbicides: (1) they would be used in strict accordance with the manufacturer's EPA-approved labeling and would not be applied directly to water or other areas where surface water is present; (2) they would not be applied within water body buffers or applied within 25 ft (7.6 m) of wetlands that have water present at their surface; (3) they would not be mixed, transferred, or stored within 50 ft (15 m) of water bodies where a 25-ft (7.6-m) buffer is maintained, within 75 ft (23 m) of water bodies where a 75-ft (23-m) buffer is maintained, or within 50 ft (15 m) of wetlands that have water present at the surface; (4) they would not be applied, mixed, transferred, or stored within 50 ft (15 m) of known rare plant species or identified unique natural communities, within 100 ft (30 m) of any known wells or springs, or within 100 ft (30 m) of a home or other human dwelling; (5) they would not be applied during rain; (6) the foreman of every crew using herbicides would be licensed and remain in eye contact with all persons in his crew applying herbicides; (7) the herbicides would typically be mixed in a truck-mounted tank that would stay on access roads; (8) they would be applied in accordance with applicable regulations promulgated by the Maine Pesticides Control Act; and (9) each target tree would be only sprayed until the foliage was covered with little or no runoff.

- Vegetation maintenance activities with motorized equipment within moderate and high-value waterfowl and wading bird habitat would be prohibited between April 15 and July 15 each year to minimize the potential disruption of avian breeding and nesting activity.

- Vegetation maintenance in areas of unique natural areas would consist of hand cutting all capable species and topping other vegetation that is greater than 8 to 10 ft (2.4 to 3.0 m) tall. No herbicides would be allowed within 50 ft (15 m) of these areas.

- BHE would maintain an updated sensitive area database to note all sensitive areas along the ROW and their locations relative to the nearest support structure. These data would be incorporated into the Vegetation Maintenance Plan.

2.5 COMPARISON OF ALTERNATIVES

Table 2.5-1 at the end of this section presents a comparison of the alternatives on the basis of the analysis presented in Chapter 4.

The following resource areas were evaluated for potential impacts:

- Air quality,
- Land features,
- Land use,
- Hydrological resources,
- Ecological resources,
- Cultural resources,
- Socioeconomics,
- Minority and low-income populations (environmental justice),
- Visual resources, and
- Health and safety.

The following discussion emphasizes the environmental implications of choosing among the alternatives, organized by resource area. Impacts during construction (approximately 12 to 18 months) and operation (particularly maintenance) of the project are considered. The discussion is followed by Table 2.5-1, which provides a more quantitative look at the differences among alternatives. In general, the Rescission of the Presidential Permit Alternative has the least impact on the environment because it does not involve ground-disturbing activities or the introduction of a transmission line into the visual landscape.

2.5.1 Air Quality

No significant differences in air quality impacts would occur for any of the four route alternatives. Temporary localized fugitive dust emission impacts from construction activities

would occur. Fugitive dust impacts would be tempered since as much construction as possible would be conducted in winter and since, in most cases, ground vegetation would not require removal. The use of vehicles and equipment during construction and maintenance would also result in short-term localized emission of air pollutants. During operation of the line, corona-produced ozone (O_3) would be less than 1.0 part per billion (ppb), well below the 8-hour and 1-hour O_3 standards of 80 ppb and 120 ppb, respectively. A conformity review is not required for the proposed project because the project area is not located within a nonattainment area for any of the criteria pollutants.

Under the Rescission of the Presidential Permit Alternative, BHE would not build the NRI. Therefore, there would be no impacts on air quality beyond those already occurring.

2.5.2 Land Features

The construction of the NRI along any of the alternative routes would not impact geologic resource availability. Construction of the alternative routes would require the excavation of approximately 7,933 yd^3 (6,069 m^3) of soil from the Previously Permitted Route, 9,097 yd^3 (6,959 m^3) of soil from the Modified Consolidated Corridors Route, 11,913 yd^3 (9,113 m^3) of soil from the Consolidated Corridors Route, and 12,347 yd^3 (9,445 m^3) from the MEPCO South Route. The amount of soil removed for any alternative route would be very small relative to the availability of the material in the region. Localized terrain changes could result from the installation of support structures, substation expansion, or establishment of new temporary access roads. These terrain changes would be localized to the individual locations of the support structures, the substation expansion area, and new temporary access roads. Because of the relatively flat terrain of most of the project area, topographic changes to the area would be negligible. Impacts on soils from localized erosion and compaction would be negligible because standard mitigation practices would be used to minimize soil erosion and promptly restore construction areas (Section 2.4). Because most of the construction activities in sensitive areas would be conducted in winter when precipitation occurs as snowfall and the soil surface is frozen, the potential for soil erosion or compaction as a result of construction would be minimized. None of the alternative routes are located in areas of relatively high seismic activity.

Under the Rescission of the Presidential Permit Alternative, BHE would not build the NRI. Therefore, there would be no impacts on land features (physiography, geology, and soils) beyond those already occurring.

2.5.3 Land Use

All four alternative routes would cross primarily through privately owned commercial forested land. ROW clearance and support structure installation are the main activities under the proposed action that could result in impacts on land use. The line length of each of the alternatives, except for the MEPCO South alternative, would be relatively similar (84 to 85 mi [135 to 137 km]). The MEPCO South line would be 114 mi (183 km) long.

Between about 1,391 and 1,513 acres (563 and 612 ha) of forested land could be impacted by ROW land-disturbing activities for the alternative routes, which is a very small fraction of the local acreage of timberlands (approximately 4.3 million acres [1.7 million ha]) within Hancock, Penobscot, and Washington Counties. The presence of the proposed project would not restrict the continuation of commercial forestry in areas adjacent to the ROW; however, the ROW area would be excluded from future timber production for the life of the project.

Between 28 and 86 acres (11 and 34 ha) of agricultural land (cropland, orchards, pastureland, and rangeland) could be impacted by the alternative routes. In the three-county area, there are more than 300,000 acres (120,000 ha) of land in farms. The MEPCO South Route would impact 86 acres (34 ha), while the other three routes would be at the low end of the range. The presence of the ROW would not restrict the continuation of agricultural land use, but it is probable that some support structures would need to be placed within agricultural lands. A support structure would exclude no more than 0.03 acre (0.01 ha) of agricultural land from production. Between 0.29 and 1.32 acres (0.12 and 0.53 ha) of agricultural land could be lost from production by the alternative routes because of constraints on farm equipment use in the immediate area of support structures (including guy wires).

Recreational activities in the project area include all-terrain vehicle (ATV) use, snowmobiling, canoeing, fishing, and hunting. The primary impact on recreational activities would be increased access and a change in the visual setting where recreation occurs. No land would be taken out of or removed from recreational use as a result of the proposed project. The Modified Consolidated Corridors, Consolidated Corridors, and Previously Permitted Routes would be within the viewshed of two Outstanding River Segments.

The proposed project could affect residential areas either visually or through displacement of dwellings by condemnation through BHE's eminent domain rights as a public utility. Up to 10 dwellings would be displaced for the MEPCO South Route, while no dwellings would be displaced for the Modified Consolidated Corridors Route. The Previously Permitted and Consolidated Corridors Routes would displace two and three dwellings, respectively. The number of dwellings within 600 ft (183 m) of the proposed project[11] would be 121 for the MEPCO South Route, 59 for the Consolidated Corridors Route, 40 for the Modified Consolidated Corridors Route, and 39 for the Consolidated Corridors Route.

No potentially limiting land use issues have been identified for the Modified Consolidated Corridors Route, Consolidated Corridors Route, or MEPCO South Route. The Previously Permitted Route crosses about 40 mi (64 km) of land owned by International Paper, and logging operations along this portion of the route could be disrupted. The Machias River

11 The 600-ft (183-m) distance was selected during BHE's stakeholder process, for the purpose of evaluating visual impacts on landowners (Paquette 2005ll), and has been accepted by DOE as reasonable.

Project[12] could also preclude the Previously Permitted Route's proposed crossing location of the Machias River (Paquette 2005j).

Under the Rescission of the Presidential Permit Alternative, BHE would not build the NRI. Therefore, there would be no land use impacts beyond those already occurring.

2.5.4 Hydrological Resources

No adverse impacts on surface water or groundwater resources would occur from any of the alternative routes. All four alternative routes would span about the same number of streams and rivers. BHE would avoid placing structures within 75 ft (23 m) from the top of stream banks (25 ft [7.6 m] for the portion that would parallel the existing 345-kV transmission line). However, support structures would be placed as close to Atlantic salmon streams of special concern[13] as possible to minimize the amount of clearing required in order to maintain stream temperatures. The Modified Consolidated Corridors, Consolidated Corridors, and Previously Permitted Routes would cross two Outstanding River Segments. Support structures would be placed farther away from these streams to minimize visual impacts. However, because the crossing locations for these streams are relatively open, no changes in stream temperatures from the ROW are expected.

Restrictions on refueling and herbicide mixing locations would protect surface water and groundwater from contamination by fuel, lubricants, and herbicides during construction. Standard mitigation practices would be implemented along the length of the line for erosion and sedimentation control.

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12 The Machias River Project was a Nature Conservancy initiative to establish conservation protection for the Machias River shoreline. In 2003, a transaction involving the State of Maine, The Nature Conservancy, and International Paper was completed, creating a conservation corridor along the Machias River consisting of conservation easement and fee ownership. In the vicinity of Stud Mill Road, this conservation corridor was conveyed to the State of Maine as fee land (i.e., the State became the owner of the property). This corridor is approximately 2,500 ft (762 m) wide and extends north of Stud Mill Road to include the area of the crossing of the Previously Permitted Route (Sloan 2005c). At Stud Mill Road, International Paper retained a 1,000-ft (205-m)-wide utility corridor that was subsequently conveyed to ECHO Easement Corridor, LLC. This utility easement provides the right to construct and maintain most types of utility facilities, including electric transmission lines. The Modified Consolidated Corridors and Consolidated Corridors Routes would cross the Machias River within this utility easement. In contrast, the Previously Permitted Route would cross the Machias River within the Machias River conservation corridor, where there is currently no established utility easement. The absence of an existing utility easement at this location does not preclude the crossing of the river by the Previously Permitted Route. A stream crossing may be negotiated with the State, or this portion of the Previously Permitted Route could be rerouted to move the Machias River crossing approximately 3,400 ft (1,036 m) south to the ECHO Easement Corridor location (Sloan 2005c).

13 An Atlantic salmon stream of special concern is a stream or river identified by the Maine Atlantic Salmon Commission as being most important to the various life stages of the Atlantic salmon.

No support structures would be located in stream, and the placement of support structures elsewhere in floodplains is not expected to result in any increase in flood hazard. The support structure poles would not impede floodwater movement or reduce floodwater-storage capacity.

Under the Rescission of the Presidential Permit Alternative, BHE would not build the NRI. Therefore, there would be no impacts on hydrological resources beyond those already occurring.

2.5.5 Ecological Resources

Vegetation would be affected by clearing to establish the ROW, installation of support structures, creation of new temporary access roads, and installation of AC mitigation, as required. Forest clearing for the project would fragment habitat by creating a new ROW through contiguous forested habitats or by expanding the ROW width where the NRI would be co-located with existing facilities. The acreage of forest clearing for the ROW would be as follows: Modified Consolidated Corridor Route — 1,411 acres (570 ha); Consolidated Corridors Route — 1,391 acres (563 ha); Previously Permitted Route — 1,461 acres (591 ha); and MEPCO South Route — 1,513 acres (612 ha). The ROW would be maintained in a shrubland or old field condition. Standard mitigation practices would minimize the potential for adverse impacts from selective herbicide use.

The potential impacts on wildlife for each alternative route would be proportional to the total acreage of the ROW. Impacts from transmission line construction would be local and affect only individual animals. Impacts (beneficial or adverse) from the establishment of a ROW corridor on individual wildlife species are summarized in Appendix D. Population-level impacts on wildlife species are considered to be very unlikely. Herbicides would not be expected to adversely affect wildlife. The potential exists for birds to collide with the transmission line conductors and shield wires. This would be most likely to occur where the proposed project crosses through areas where birds would be most likely to congregate, such as waterfowl and wading bird habitats. The acreage of waterfowl and wading bird habitats that would be crossed by the proposed project would be as follows: Modified Consolidated Corridors Route — 133 acres (54 ha); Consolidated Corridors Route — 113 acres (45 ha); Previously Permitted Route — 93 acres (37 ha); and MEPCO South Route — 148 acres (60 ha).

Minimal adverse impacts on aquatic biota would be expected for any alternative route because standard mitigation practices would be used to minimize erosion and sedimentation, stream warming, and chemical contamination (e.g., by herbicides or fuel).

Impacts on wetlands would occur where forested wetlands are converted to scrub-shrub or emergent wetlands. The acreage affected would be as follows: Modified Consolidated Corridors Route — 70 acres (29 ha); Consolidated Corridors Route — 53 acres (21 ha); Previously Permitted Route — 103 acres (41 ha); and MEPCO South Route — 73 acres (29 ha). Only very minor permanent fills of wetlands would occur from support structure pole placement in wetlands. No impacts on wetlands with standing water from herbicide use are expected for any alternative route.

Impacts on special status species would be similar to those described for other biota, but any impacts could affect their populations because of the species' limited distribution and/or abundance. The establishment of a ROW would be potentially beneficial for some special status species and adverse for others (see Table 4.5-4). Potential adverse impacts from construction and maintenance of the ROW would be minimized or eliminated by the implementation of standard mitigation practices aimed at special status species. For example, ball markers and/or flappers would be placed on shield wires across the St. Croix River, Machias River, Narraguagus River, Great Works Stream, and Penobscot River to minimize the potential for bald eagles to collide with the wires, and standard mitigation practices would be employed at Atlantic salmon EFH streams to minimize erosion and sedimentation, protect stream banks, and maintain stream shading.

Under the Rescission of the Presidential Permit Alternative, BHE would not build the NRI. Therefore, there would be no impacts on ecological resources beyond those already occurring.

2.5.6 Cultural Resources

No impacts on cultural resources are expected for the Modified Consolidated Corridors Route. The route was modified to avoid the one significant historic property recorded during the archaeological survey for the proposed project. Impacts on cultural resources are possible, but unlikely, for the Consolidated Corridors and Previously Permitted Routes; impacts on cultural resources would be more probable, however, for the MEPCO South Route since the Penobscot River drainage has been identified as an area of high potential for containing significant archaeological material. A cultural resource survey and approval of the survey results by the Maine State Historic Preservation Officer (SHPO) would be required if the Consolidated Corridors Route, Previously Permitted Route, or MEPCO South Route were selected for the proposed project. Archaeological surveys may be required in areas designated for new temporary access roads and some staging areas. No cultural resources are expected in areas where AC mitigation may be required, since those areas were previously disturbed when the M&N gas pipeline was installed.

Under the Rescission of the Presidential Permit Alternative, BHE would not build the NRI. Therefore, there would be no impacts on cultural resources beyond those already occurring.

2.5.7 Socioeconomics

The construction of the Modified Consolidated Corridors, Consolidated Corridors, or Previously Permitted Routes would create approximately 120 direct (construction) jobs and approximately 110 indirect (service-related) jobs. The MEPCO South Route would create approximately 150 direct and 130 indirect jobs. The jobs created by the construction of the NRI would primarily benefit Hancock, Penobscot, and Washington Counties. No significant influx of population or stress to community services would be expected from project construction. No

socioeconomic impacts would be expected from project operation because most jobs created would be filled by current residents.

Under the Rescission of the Presidential Permit Alternative, BHE would not build the NRI. Therefore, there would be no socioeconomic impacts beyond those already occurring.

2.5.8 Environmental Justice Considerations

The Modified Consolidated Corridors, Consolidated Corridors, and Previously Permitted Routes would not have a disproportionately high and adverse impact on minority or low-income populations. One minority census block group occurs within a small portion of the 2-mi (3.2-km) buffer along the MEPCO South Route. Standard mitigation practices would minimize potential impacts from noise, dust, and emissions during construction.

Under the Rescission of the Presidential Permit Alternative, BHE would not build the NRI. Therefore, there would be no impacts on environmental justice considerations beyond those already occurring.

2.5.9 Visual Resources

Visual impacts would occur primarily from the introduction of support structures and transmission line wires into the landscape. A transmission line along any of the alternative routes would be moderately incompatible, mildly contrasting, and, occasionally, a dominant feature in the landscape. This would be most notable in areas where more remote recreational activities occur. The MEPCO South Route would be visible to more residents than the other alternatives, given its closer proximity to more towns and roads along the Route 2 and Route 6 corridors. The Modified Consolidated Corridors, Consolidated Corridors, and Previously Permitted Routes would cross two Outstanding River Segments (Narraguagus and Machias Rivers). Standard mitigation practices would be used to minimize visual impacts at these two river crossings and at the U.S. side of the St. Croix River, which would be crossed by all four alternative routes.

Under the Rescission of the Presidential Permit Alternative, BHE would not build the NRI. Therefore, there would be no impacts on visual resources beyond those already occurring.

2.5.10 Health and Safety

Procedures are well established to reduce or eliminate the potential for shock hazards associated with operation of the NRI. AC mitigation would be required where the NRI would be located near, parallel to, or cross over the M&N gas pipeline.

Although each alternative route passes primarily though forested land, the MEPCO South Route would have the highest number of houses in close proximity to the transmission line. Electric field exposures at the edge of the ROW for all alternatives would be less than guidelines

that have been established by several states. Magnetic field exposures at most residences for all routes would be well below average daily exposure to maximum magnetic fields (0.8 milligauss [mG]) from some common household and office appliances and machinery. No health effects would be expected from electric and magnetic field (EMF) exposure.

There are no noteworthy differences in potential noise impacts from any of the four alternative routes. Noise levels would increase above background during construction. Temporary construction noise increases would primarily impact residents and recreationists close to the ROW. Elevated noise would occur only during daytime. During operation, long-term noise from the corona effect on transmission lines would generally be lost in background noise.

The potential risk to people with pacemakers would be negligible for all alternative routes. The potential for radio and television interference from the proposed project would be negligible. What little potential there is would be slightly greater for the MEPCO South Route because it has more dwellings within 100 ft (30 m) of the ROW and has more highway crossings than the other alternative routes.

The potential human health risks from herbicide usage for maintaining the proposed project ROW would be negligible because of adherence to regulations and implementation of standard mitigation practices associated with the use of these products.

The potential for fatalities of, and injuries to, construction and maintenance workers would be slightly greater for the MEPCO South Route than for the other alternative routes because of its greater length, which would require more clearing and more support structures. Nevertheless, fatality risks would be less than 1 fatality for all alternative routes. Nonfatal occupational injuries and illnesses for construction of the NRI would be 9.7 for the MEPCO South Route and 6.9 for the other alternative routes; nonfatal injuries and illnesses during maintenance would be fewer than 1 per 10 full-time field personnel for all alternative routes. The use of standard mitigation practices for occupational health and safety compliance would reduce the potential for fatalities and injuries.

Under the Rescission of the Presidential Permit Alternative, BHE would not build the NRI. Therefore, there would be no impacts on health and safety beyond those already occurring.

TABLE 2.5-1 Summary of Key Project and Environmental Characteristics and Potential Impacts of the Proposed Action and Other Alternatives by Resource Area[a]

Resource Area (EIS Impact Analysis Section Number)	Modified Consolidated Corridors Route (Preferred Alternative)	Consolidated Corridors Route Alternative	Previously Permitted Route (No Action Alternative)	MEPCO South Route Alternative	Recission of Presidential Permit Alternative
Air Quality (4.1)					
Construction	Temporary localized fugitive dust emissions from construction activities would occur. These would be negligible, since as much construction as possible would be conducted during winter when the soil surface is frozen and since ground-level vegetation would be maintained to the extent possible. No conformity review required as the project area is in attainment with the EPA's NAAQS.				No impact on air quality. Current air quality trends would continue.
Operation	Impacts from operation and maintenance activities would be limited to vehicle emissions and dust from occasional travel on unpaved roads by BHE personnel or their contractors. Corona would generate less than 1 ppb of ozone in the immediate vicinity of the conductors.				
Land Features (4.2)					
Physiography	Negligible localized terrain changes could occur from installation of support structures, substation expansion, and establishment of new temporary access roads.				No impacts on land features.
Geology	Impacts on geologic resources would be negligible. The placement of poles, new temporary access roads, and substation expansions would require some disturbance and removal of near-surface material. (See *Land Use* for estimates of areas disturbed.) Foundations for wood-pole support structures would require direct embedment of poles, requiring excavation of pits. Blasting may be required in areas of shallow bedrock. Concrete fill or foundations would be required for steel-pole support structures.				
Soils	Impacts on soils from erosion and compaction would be negligible because of the use of standard mitigation practices to minimize soil erosion and to promptly restore construction areas (Section 2.4).				
Seismicity	Low seismic risk within the project area.				
Land Use (4.3)					
Total ROW length (mi)[b]	85	85	84	114	
Total ROW area (acres)[c]	1,566	1,522	1,633	1,734	

TABLE 2.5-1 (Cont.)

Resource Area (EIS Impact Analysis Section Number)	Modified Consolidated Corridors Route (Preferred Alternative)	Consolidated Corridors Route Alternative	Previously Permitted Route (No Action Alternative)	MEPCO South Route Alternative	Recission of Presidential Permit Alternative
Land Use (4.3) (Cont.)					
Length of new ROW (mi)	15	2	62	39	No impacts on existing land use.
Length adjacent to existing MEPCO or EMEC transmission lines (mi)	5	8	5	68	
Length adjacent to M&N gas pipeline and MEPCO transmission line (mi)	7	7	7	7	
Length adjacent to M&N gas pipeline and/or Stud Mill Road (mi)	58	68	10	0	
Number of support structures	608	636	563	885	
Number of support structure poles	1,333	1,436	1,190	1,834	
Permanent area occupied by all support structure poles (acres)	0.5	0.5	0.4	0.6	
Permanent additional area occupied by substation modifications (acres)	1.0	1.0	1.0	1.0	
Area requiring clearing for new temporary access roads (acres)	0	0	21	32	
Temporary area occupied by staging areas (acres)	42	42	42	57	

TABLE 2.5-1 (Cont.)

Resource Area (EIS Impact Analysis Section Number)	Modified Consolidated Corridors Route (Preferred Alternative)	Consolidated Corridors Route Alternative	Previously Permitted Route (No Action Alternative)	MEPCO South Route Alternative	Recission of Presidential Permit Alternative
Land Use (4.3) (Cont.)					
Temporary disturbance by installation of AC migitation over M&N gas pipeline (acres)[d]	82	82	82	54	
Forested lands within ROW (acres)	1,411	1,391	1,461	1,513	
Agricultural lands within ROW (acres)	30	28	28	86	
Agricultural lands within ROW lost from production (acres)	0.35	0.35	0.29	1.32	
Other land use within ROW (acres)	125	103	144	135	
Number of displaced dwellings	0	3	2	10	
Number of dwellings within 300 ft	14	20	10	47	
Number of dwellings within 600 ft	40	59	39	121	
Recreation	Recreational activities in the vicinity of the proposed project would primarily be impacted by a change in the visual setting of the recreation and by providing further access to recreational activities such as fishing, hunting, and ATV use.				
ATV impact areas (number of new or enhanced access areas)	0	0	19	1	

TABLE 2.5-1 (Cont.)

Resource Area (EIS Impact Analysis Section Number)	Modified Consolidated Corridors Route (Preferred Alternative)	Consolidated Corridors Route Alternative	Previously Permitted Route (No Action Alternative)	MEPCO South Route Alternative	Recission of Presidential Permit Alternative
Land Use (4.3) (Cont.)					
Land use conflicts	No conflicts identified.	No conflicts identified.	Potentially conflicts with commercial logging activities.	No conflicts identified.	
Hydrological Resources (4.4)					
Construction and maintenance impacts	No adverse impacts on groundwater or surface water resources. Construction activities would not occur within streams or rivers. Standard mitigation practices would minimize erosion and sedimentation, loss of stream shading, and potential for contamination from herbicides and fuels.				No hydrological resource impacts. Current hydrologic resource patterns would continue.
ROW crossings of stream (number)	67	66	65	66	
ROW crossings of Class AA streams (number)	13	10	18	5	
ROW crossings of Class A streams (number)	44	46	41	41	
Crossings of streams for new temporary access roads (number)	0	0	0	1	
Lakes within 1 mi of ROW (number)	24	25	22	11	
Floodplains	Negligible change in flood elevation or changes in flow-carrying capacity of streams because of support structure placement in floodplains.				
Ecological Resources (4.5)					
Terrestrial vegetation	Upland vegetation would be primarily affected by clear-cutting or selective cutting to establish the ROW and, where required, installation of AC mitigation.				No impacts on ecological resources.
Forest lands crossed by ROW (acres)	1,411	1,391	1,461	1,513	

TABLE 2.5-1 (Cont.)

Resource Area (EIS Impact Analysis Section Number)	Modified Consolidated Corridors Route (Preferred Alternative)	Consolidated Corridors Route Alternative	Previously Permitted Route (No Action Alternative)	MEPCO South Route Alternative	Recission of Presidential Permit Alternative
Ecological Resources (4.5) (Cont.)					
Disturbance of low-lying vegetation by installation of AC mitigation (acres)	82	82	82	54	
Wildlife	Impacts from transmission line construction would be temporary, local, and affect only individual animals. Impacts (beneficial or adverse) from the establishment of a ROW corridor on individual wildlife species are summarized in Appendix D of the EIS. Population-level impacts are considered to be very unlikely.				
Number of deer wintering areas crossed by ROW	2	1	2	1	
Area of deer wintering areas crossed by ROW (acres)	7.3	5.8	6.5	7.6	
Waterfowl and wading bird habitats crossed by ROW (acres)	133	113	93	148	
Aquatic biota	No adverse impacts on aquatic biota expected because of mitigation measures that would minimize the potential for erosion and sedimentation, stream warming, and chemical contamination (herbicides and fuel).				
Wetlands					
Number of NWI wetlands crossed by ROW	188	184	193	319	
Area of NWI wetlands crossed by ROW (acres)	133	108	152	173	
Length of NWI wetlands crossed by ROW (mi)	7.7	6.6	8.2	11.6	

TABLE 2.5-1 (Cont.)

Resource Area (EIS Impact Analysis Section Number)	Modified Consolidated Corridors Route (Preferred Alternative)	Consolidated Corridors Route Alternative	Previously Permitted Route (No Action Alternative)	MEPCO South Route Alternative	Recission of Presidential Permit Alternative
Ecological Resources (4.5) (Cont.)					
Number of wetland crossings for new temporary access roads	0	0	2	11	
Forested wetlands converted to scrub-shrub or emergent wetlands in ROW (acres)	70	53	103	73	
Forested wetlands converted to scrub-shrub or emergent wetlands for new temporary access roads (acres)	0	0	0	0.6	
Special status species	Impacts are not expected to produce population-level effects that are distinguishable from natural variations in numbers or caused from ongoing perturbations (such as commercial forestry operations). Mitigation measures would protect special status species.				
Number of EFH water bodies crossed by ROW	67	66	65	66	
Forested land converted to scrub-shrub land within 150 ft of EFH water bodies (acres)	82	89	92	65	
Number of Atlantic salmon distinct-population-segment water bodies crossed by ROW	31	32	27	0	
Number of Atlantic salmon streams of special concern crossed by ROW	9	9	9	0	

TABLE 2.5-1 (Cont.)

Resource Area (EIS Impact Analysis Section Number)	Modified Consolidated Corridors Route (Preferred Alternative)	Consolidated Corridors Route Alternative	Previously Permitted Route (No Action Alternative)	MEPCO South Route Alternative	Recission of Presidential Permit Alternative
Ecological Resources (4.5) (Cont.)					
Number of shortnose sturgeon habitats crossed by ROW	0	0	0	2	
Number of known bald eagle essential habitats crossed by ROW	0	0	0	1	
Cultural Resources (4.6)					
Potential for impacts on cultural resources	No impacts expected.	Impacts possible, but unlikely.	Impacts possible, but unlikely.	Impacts probable; Penobscot River drainage identified as an area of high potential for containing significant archaeological material.	No impacts on cultural resources.
Historic archaeological resources (number of sites within ROW)	0	0	0	1	
Historic archaeological resources (number of sites within 1 mi of ROW)	8	8	8	10	
Prehistoric archaeological resources (number of sites within ROW)	4	5	4	12	
Prehistoric archaeological resources (number of sites within 1 mi of ROW)	30	31	28	46	
NRHP sites (number of sites within ROW)	0	0	0	0	

TABLE 2.5-1 (Cont.)

Resource Area (EIS Impact Analysis Section Number)	Modified Consolidated Corridors Route (Preferred Alternative)	Consolidated Corridors Route Alternative	Previously Permitted Route (No Action Alternative)	MEPCO South Route Alternative	Recission of Presidential Permit Alternative
Cultural Resources (4.6) (Cont.)					
NRHP sites (number of sites within 1 mi of ROW)	0	0	0	1	
Significant sensitive soils within ROW (acres)	87	111	115	21	
Significant sensitive soils within 1 mi of ROW (acres)	2,843	3,496	3,334	1,763	
Number of locations possessing high and moderate archaeological sensitivity along each ROW	51	51	51	59	
Socioeconomics (4.7)					
Construction period	Socioeconomic impacts would be similar for these three alternative routes. The proposed project would result in the creation of approximately 120 direct (construction) jobs and approximately 110 indirect (service-related) jobs during construction. No influx of population or stress to community services would be expected.			The proposed project would result in the creation of approximately 150 direct and 130 indirect jobs during construction. No influx of population or stress to community services would be expected.	No socioeconomic impacts. Current socioeconomic trends would continue.
Operational period	No adverse socioeconomic impacts would be expected from project operation for any of the alternative routes.				

TABLE 2.5-1 (Cont.)

Resource Area (EIS Impact Analysis Section Number)	Modified Consolidated Corridors Route (Preferred Alternative)	Consolidated Corridors Route Alternative	Previously Permitted Route (No Action Alternative)	MEPCO South Route Alternative	Recission of Presidential Permit Alternative
Environmental Justice Considerations (4.8)					
Project impacts	No disproportionately high and adverse impacts on minority or low-income populations.			One minority census block group occurs within the 2-mi zone along the route. No disproportionately high and adverse impacts on minority or low-income populations.	Existing conditions would continue. No disproportionately high and adverse impacts on minority or low-income populations.
Native American lands crossed by ROW (acres)	0	0	0	4	
Visual Resources (4.9)					
Visual impacts	Visual impacts would occur from the introduction of support structures and transmission line wires into the landscape. Substation expansions would have negligible visual impact given that similar equipment already exists on site and because of existing development in the area of the substations.				The existing landscape and scenic integrity would continue.
Number of Outstanding River Segments crossed by ROW	2	2	2	0	
Health and Safety (4.10)					
Electric shocks	Industrywide standards are in place to eliminate or greatly reduce the potential for electric shocks for all alternative routes. AC mitigation would be required to reduce shock hazards for the M&N gas pipeline.				No health and safety impacts. EMF exposure from existing transmission lines and household appliances would continue. Current noise patterns would continue. No fatalities or injuries from construction or maintenance activities.
EMF effects	EMF exposure at the nearest residences would mostly be below the average daily exposure to maximum magnetic fields from common household appliances. Electric field exposures at the edge of the ROW would be below guidelines that have been established for several states. No health effects would be expected from this exposure.				
Noise effects	The primary effect of noise would be annoyance to the residents and recreationists nearest to the ROW during construction, and this impact would be short term. Long-term noise from corona effect on transmission lines would be generally lost in background noise. Noise from maintenance activities (such as tree trimming with chainsaws) would be localized, short lived, and infrequent.				

TABLE 2.5-1 (Cont.)

Resource Area (EIS Impact Analysis Section Number)	Modified Consolidated Corridors Route (Preferred Alternative)	Consolidated Corridors Route Alternative	Previously Permitted Route (No Action Alternative)	MEPCO South Route Alternative	Recission of Presidential Permit Alternative
Health and Safety (4.10) (Cont.)					
Cardiac pacemaker and radio/television interference	The potential risk to people with pacemakers and the potential for radio and television interference would be negligible for all alternative routes. What little potential there is would be slightly greater for the MEPCO South Route because it has more dwellings within 100 ft of the ROW and has more highway crossings than the other alternative routes.				
Herbicide use	The potential human health risks from herbicide usage would be negligible for all alternative routes because of regulations and standard mitigation practices associated with the use of these products.				
Project-related fatalities and injuries	The potential risk of occupational physical injuries or fatalities to construction and maintenance workers would be small (i.e., <1 death and <10 nonfatal injuries from construction and <0.1 death and <6 nonfatal injuries from maintenance). The potential risk of physical injuries or fatalities to the general public would be small and would primarily occur from indirect impacts such as snowmobile or ATV accidents while using the ROW.				

[a] Abbreviations: AC = alternating current, ATV = all-terrain vehicle, BHE = Bangor Hydro-Electric Company, EFH = essential fish habitat, EMEC = Eastern Maine Electric Cooperative, EPA = U.S. Environmental Protection Agency, MEPCO = Maine Electric Power Company, M&N = Maritimes & Northeast Pipeline, L.L.C., NAAQS = National Ambient Air Quality Standards, NRHP = *National Register of Historic Places*, NWI = National Wetlands Inventory, ppb = part(s) per billion, ROW = right-of-way.

[b] To convert miles to kilometers, multiply by 1.609; to convert acres to hectares, multiply by 0.405; to convert feet to meters, multiply by 0.305.

[c] Total area was determined by multiplying ROW length by ROW width on the basis of the following assumptions: (1) width of new ROW would be 170 ft; (2) width of ROW when adjacent to existing transmission line would be 100 ft; (3) width of ROW when adjacent to M&N gas pipeline and a transmission line would be 125 ft; and (4) width of ROW when adjacent to M&N gas pipeline and/or Stud Mill Road would be 155 ft.

[d] Installation of AC mitigation over the M&N gas pipeline is a connected action to the proposed project.

Sources: Information provided in this table was obtained from BHE (2004, 2005) and/or Paquette (2005a through 2005nn).